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A Stanford University project in which mathematical learning theory was applied to the learning of Russian in a first-year, computer-based college course is examined in this report. Included in the description of this project, designed to complete and implement the first-year Russian course, are the research and curriculum potentials of computer-based instruction, specific methods and techniques employed in conducting the experiment, and an analysis of the research findings. The bulk of the report appears in the form of appendixes which give examples of computer input codes, descriptions of the computer system, statistics on enrollment, lengthy tables of student responses, final examination results, an outline of grammatical points covered, and samples of the daily student summary sheets. (CW)

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Project for Application of Mathematical Learning Theory to Second-language Acquisition, with Particular Reference to Russian

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Summary

The primary object of this project was to complete and implement a computer-based course in first-year college Russian. Such a course, consisting of some 135 computer-based sessions, was indeed completed and constituted a part of the offerings of the Slavic Department at Stanford University during the academic year 1967-68. The computer-based course was taken on a regular credit basis by Stanford students, and both the midterm and the final examinations for each of the three academic quarters were largely or, in the case of the spring final, totally identical with the examinations taken by students in Stanford's regular first-year Russian course.

The availability of daily reports on the progress of individual students enabled the principal investigator to obtain immediate feedback on the effectiveness of various instructional techniques and to discard those which seemed less useful. The cumulative result of this experience was a set of principles regarding the optimal utilization of the computer in foreign-language instruction.

As the year progressed, the type of instruction was changed from a simple linear program to one permitting the use of human-generated remedial branching. Plans were laid and largely implemented for a more sophisticated type of instructional program in which machine-generated remedial branching would be used to permit almost unlimited possibilities for individual instruction.

A vast amount of data on student performance was collected, reduced to a usable form, and subjected to a preliminary analysis with regard to certain questions of general interest.

After the completion of the academic year, the course was revised in accordance with the principles mentioned above.

Chapter 1

Introduction

The main subject of this report is the computer-based course in first-year college Russian written by the principal investigator and implemented at the Institute for Mathematical Studies in the Social Sciences at Stanford University. Since computer-based courses of this type have not, to our knowledge, been available up to now, it may be well to say a few words about the exact nature of our undertaking.

1.1. "Computer-based" as Opposed to "Computer-assisted" Instruction

Perhaps the most important feature of the course was that it was not "computer-assisted," but "computer-based." While the former type of instruction uses the computer to supplement or reinforce skills taught by a classroom teacher, the latter relies solely on the computer to convey information to the student. In the Stanford computer-based course, no classroom instructors were used for the acquisition of reading, writing, or aural comprehension skills, although written homework and language-laboratory drills were corrected by a research associate and returned to the students. No classroom instruction was given in pronunciation, although the students did make short recordings of their own speech which were evaluated for them in private interviews with a native Russian. Even in this case, no new information was "taught" by the evaluator.

1.2. Computer-based Instruction as a Tool for the Teaching of Foreign Languages

The learning of a foreign language differs from the attainment of many other skills, in that it entails the memorization of a very large number of items many of which are essentially independent of one another. Thus, the fact that the Russian word for "table" is stol is in no way derivable from the fact that the word for "chair" is stul. Again, the fact that the ending of the masculine past of Russian verbs is -l-, is in no way predictable from the fact that the ending of the first person singular of the present tense is -u-.

It follows that the student of a foreign language may fail to handle a given task successfully for a large number of reasons, some of which have nothing to do with the material he is currently studying. Thus, a student studying the accusative case who is called upon to translate "He is reading a book" may fail not only because he does not know how to generate the accusative of "book," but because he does not know the Russian word for "book," or because he does not know one or more of the words or forms needed to generate the rest of the sentence. This problem may be dealt with in a number of ways. Either the task to be performed may be kept so simple as to vastly reduce the possible sources of error, or, if a more complex response is demanded, the true source of any given error can be traced and remedied. Classroom instruction in a foreign language is in general not congenial to the second approach. Thus, form and pattern drills are much more suited to classroom use than the detailed analysis of a single long sentence. Indeed, the overly detailed treatment of a long response made by a single student is generally regarded as bad for the morale of other students.

However, even the use of relatively simple drill responses in the classroom entails problems, since a student who has responded satisfactorily in a drill of a given type cannot proceed independently to new responses; he must wait for the drill to end.

Computer-based language instruction makes possible both the detailed remedial analysis of long responses and the adaptation of drill material to meet the needs of the individual student. By the end of the implementation of our first-year course, we were able to branch students to remedial drills if they failed to handle relatively simple items. A program has been developed now which generates a detailed set of "remedial" branches designed to ascertain which factor or factors underlie failure in the case of a complex response. Once the cause of the failure has been determined, the student can be branched to the appropriate drill, either immediately or during a later computer-based session.

Other features of computer-based instruction of relevance to foreign-language teaching include the large number of overt responses made by the student during a session, the immediate and personalized correction of errors in most such responses, and the absence of exposure to errors by other students. Even in a relatively small language class of, for example, eight students, the maximum average "solo" overt response time per student during a 50-minute session cannot be more than 6-1/4 minutes. In practice it is much lower. During a computer-based session of equal length, the student is responding overtly during a much larger period. Indeed, in some review sessions, our students made over 200 teletype responses to as many different stimuli in a single session. While the average classroom overt-response time can be increased by such group activities as saying sentences in unison or taking down dictation, these techniques do not readily lend themselves to the immediate correction of errors made by individual students. Thus, it is difficult to detect, much less to remedy, all the individual deviations from the correct response which occur when even as few as four people recite a sentence simultaneously. On the other hand, in the case of most classroom dictation, the correction of responses by the teacher takes place, if at all, only after an entire set of sentences has been transcribed and handed in by the student.

In our computer-based sessions all audio responses required of the student were followed by the playing of the correct response from the tape. In the case of teletype responses, active evaluation by the computer began within a few milliseconds of the completion of the response. In no case was the student able to proceed to a new response before being made aware of the adequacy of his performance on the preceding one.

While spoken responses could not be evaluated and corrected by the computer, computer-based sessions differed from the classroom situation in that the students were not exposed to the errors of other students. Our students heard only correct Russian spoken by a native speaker. Perhaps as a result of this feature, tape recordings of passages read by the computer-based group revealed relatively few pronunciation errors.

1.3. Research Possibilities

One of the most important features of computer-based instruction is the possibility of obtaining detailed data on student responses. In the case of the Russian course, such data were collected, processed, and subjected to a preliminary analysis. While the in-depth exploration of this material is largely a matter for future research, it is already clear that the collection of such data makes possible research which would not be otherwise feasible.

1.4. Curriculum Improvement

Another area in which data on student performance can be useful is the evaluation and revision of the curriculum. New approaches can be readily tested and, if necessary, discarded or modified. The facility with which such changes can be achieved made possible the introduction of significant modifications in our Russian lessons throughout the course of the entire academic year. While the classroom teacher must generally continue to employ his textbook throughout an entire course, even though he has found it unsatisfactory, the structure and content of a computer-based course can be improved on a day-to-day basis.

Chapter 2

Methods

2.1. The Students

The participants in the computer-based course were drawn from students who reported to the sectioning meeting for first-year Russian held on the first day of classes of the Stanford fall quarter in September, 1967. The students were informed that a computer-based version of the course was available, and the first 30 students who signed up were admitted to the "computer section." No selectional criteria were employed and no detailed information was gathered on the make-up of either the computer-based or the regular sections. However, it should perhaps be noted that over half of the students who eventually registered for the regular sections had expressed a desire to enroll in the computer-based section.

2.2. The Physical Framework

The computer-based sessions took place in a special classroom at the Institute in Casita Hall on the Stanford campus. During these sessions each student received coordinated audio and visual stimuli. The latter were provided by one of six Model-35 teletypes capable of printing both English and Russian texts, but having only a Russian keyboard. Audio stimuli came from a set of headphones connected to an Ampex tape player (one for each teletype) which, like the teletype, was controlled by the central processor. Thus, while the student could both listen to and read either Russian or English material, he could type only in Russian. Furthermore, only typed responses could be evaluated for accuracy by the computer. In the case of spoken responses, the student had to rely on a comparison of his own response with the correct answer given on the audio tape.

The only other item in the computer-based classroom which was regularly used by the students was a set of numbered slots--one for each student--from which the students obtained their summary sheets and both new and corrected homework assignments, and in which they deposited homework for correction.

While a proctor was regularly present during all sessions, his only function was to hang and rewind audio tapes and to report any technical difficulties to the central processing staff.

(Students using the facilities of the Stanford language laboratory for dictation and comprehension drills did so in much the same manner as students from the regular language courses. A master tape was played at hourly intervals to which students listened with laboratory earphones.)

2.3. The Underlying System

The material for the computer-based sessions was typed, corrected, and converted to machine run-mode on one of the 12 Philco display consoles at the Institute's Computer-based Laboratory. The amount of typing to enter material was greatly reduced by the use of special input coding and a preprocessor program which used the coding to generate all the redundant portions of a given frame type. A complete listing of the most recent version of our input coding, along with examples of raw and processed input, is given in Appendix 1. A discussion of the program for the generation of the machine-run code and for the control of the teletypes and tape players is given in Appendix 2, which also contains a brief outline of the entire supporting system.

2.4. Classroom Scheduling

The day following the sectioning meeting referred to in 2.1. above was devoted to arranging individual student schedules. Each student was scheduled for five computer-based sessions per week (i.e., one session per day, Monday through Friday). This schedule paralleled the class meetings of the regular sections. Students were urged to schedule all of their sessions for the same hour, but in a few cases were allowed to choose one hour for their Monday, Wednesday, Friday sessions, and another for Tuesday and Thursday.

In the fall quarter, sessions were scheduled to begin 15 minutes after the hour from 1:15 p.m. through 5:15 p.m. No students were scheduled between 6:15 p.m. and 7:15 p.m., but students were regularly scheduled for 7:15 p.m. In addition, students who had missed or failed a session were allowed to sign up for make-up sessions at 8:15 p.m. or on Saturday mornings. This schedule was also followed for the second term. In the third quarter, make-up sessions were scheduled for 12:15 p.m., and the evening and Saturday sessions were dropped--a change made possible by a decrease in student enrollment to 24 (see Appendix 3, Table 1).

Normally, only five students were regularly scheduled for a given hour on a given weekday. This allowed us to keep one instructional station as a backup station in case another station needed repairs or readjustments. However, non-scheduled students were allowed to use the sixth station for make-up sessions, if it was not needed by regularly scheduled students.

2.5. Student-computer Interaction

2.5.1. Presentation of Material

Throughout the course, the presentation of material to students remained essentially the same: English or Russian material was typed by the teletype or played by the tape player. However, it should be noted that the first lessons contained a much larger amount of English audio material than did the following ones. Eventually no English material was used on the tapes at all. In addition, as the students' knowledge of Russian increased, standard instructions, such as "listen," "repeat," and "type in Russian," were given in Russian instead of English.

2.5.2. Response Evaluation

During the first quarter, the evaluation and correction of typed responses was handled in a manner which differed radically from that used in the succeeding quarters. In the fall quarter, each character typed by the student was immediately checked with the corresponding character of the correct response. As soon as a deviation occurred, the computer took control of the teletype away from the student, informed him that he had made an error, and either told him to try again or provided the correct response, or both. This type of "immediate correction" proved unsatisfactory--primarily because no distinction was made between a genuine mistake and a typing error. As a result, students were under considerable pressure while typing a response and tended to become irritated when they committed an unintentional error.

The beginning of the winter quarter saw the implementation of a new correction routine which stores the characters typed by the student in a special response buffer until he strikes a special "terminator" key. The evaluation of the response begins only after the character corresponding to this key is received by the computer. Typing errors noticed by the student before the terminator is typed can be corrected in one of two ways: either the entire contents of the response buffer can be eliminated by typing a "line feed" (this permits the student to retype his response from the start); or, if the error is located not far from the last character typed, any number of characters, beginning with the last, may be deleted from the response buffer by typing a corresponding number of "underlines." These characters can then be replaced by the correct ones.

This approach to error correction proved highly satisfactory. As the data show (see Appendices 4, 5, 6), the overall percentage of correct responses was markedly lower for the first quarter than for the second and third quarters. Since there were no significant differences in the format of the lessons, one can at least conjecture that a sizable percentage of the "errors" recorded for the first quarter's work were typing errors.

2.5.3. Branching

During much of the first quarter, the computer-based sessions were simply linear programs through which each student proceeded in exactly the same manner. In these sessions the only variables in the instructional sequence were the inclusion or omission of an error message when the computer encountered or failed to encounter a deviating response character.

By lesson 27, routines were available which permitted the computer to omit a given block of material in a machine session if the student had handled satisfactorily a certain number of test items immediately preceding that block. Examples of such a "remedial block" and a preceding test item are given in Appendix 1 under codings such as bb, srm. Branching of this type was used throughout the course. The contents of the omittable blocks, however, changed greatly during the last weeks of the fall quarter. In session 27 and the immediately following sessions the block had often contained a short "pattern" drill on a given rule. It soon became clear that students derived little benefit from such drill, especially if the rule in question had been introduced some time before. Accordingly, during the last week of the quarter, and throughout the rest of the year, the contents of such blocks regularly consisted either of a supplementary explanation of a new rule or of an instruction to review a rule or rules presented during an earlier session. The results of the first quarter final examination (Appendix 7, Table 2) indicate that this approach was highly effective.

By the second quarter, routines had been written to allow the automatic generation of a remedial block after each of a series of drill items covered by the same rule. This development, which greatly reduced the amount of input needed in such cases, resulted in a significant increase in the number of remedial blocks included in the machine sessions.

Although no further modifications were introduced in the branch-generating routines during the academic year, there is now available a set of programs which generates a large set of remedial blocks designed to allow the detailed analysis of any error made by a student in a given sentence. Such blocks, which are generated for each Russian word of the sentence, include a test of the student's knowledge of the basic form or forms of the vocabulary item in question; a test of his awareness of the grammatical category required by the given syntactic and semantic context, and a test of his ability to generate the form corresponding to that category from the basic form. The student's performance on these tests determines whether he will be advised to review a vocabulary item or to study a syntactic or inflectional rule.

This approach to branching automatically generates machine sessions with an immeasurably more extensive set of remedial blocks than could be conveniently written by the lesson programmer himself. While there will still be cases in which it will be necessary to generate such blocks by hand, they will constitute only a small part (probably less than five per cent) of the overall total.

2.5.4. Individualization of Drill Sessions

Although no individualized drill sessions were used during 1967-68, the automatic generation of remedial blocks discussed in section 2.5.3. can easily serve as the basis for the generation of personalized drill or review sessions tailored to the needs of individual students. Thus, whenever a student fails to handle satisfactorily a vocabulary item or rule within a remedial block, the item or rule can be noted on a separate disk file under that student's number. The file can then be scanned either by a human being or by a drill-generating program for the purpose of providing further drill and review work to each student on those items which have given him difficulty in the past and which he has been instructed to review.

2.5.5. Disk-generated Audio Stimuli

While, as was noted in 2.5.1., all audio material played during the computer-based sessions came from tapes, the groundwork was laid for the use of disk-generated audio stimuli. The use of such stimuli would make it possible to include audio material in remedial blocks--a procedure not feasible under our present system.

2.5.6. Restart Points

During the first quarter, a student who, because of technical difficulties, failed to complete a computer-based session before signing off had two alternatives: repeat the entire session or request the attendant to schedule him for the next session--a request granted only if the student had completed almost the entire session.

Beginning in the second quarter, restart points were inserted in the session text, so that the student could skip material he had already completed and could start the session close to the point he had reached on the preceding day.

2.6. Supplementary Activities

In addition to the computer-based sessions, the students in the computer-based group regularly carried on a number of additional activities designed to reinforce the material taught in the classroom. These included (a) preparation of written homework assignments (primarily the translation of English sentences into Russian, occasionally the completion of missing endings in a Russian text); and (b) work with additional audiotapes in the Stanford Language Laboratory (students listened to and repeated sentences, took Russian dictation, and wrote answers to spoken Russian questions about a paragraph read on the immediately preceding portion of the tape). No new vocabulary or grammar not previously introduced in a computer-based session was included in either the homework or the laboratory tapes. All material written by the students was placed in the slots described in 2.2., collected by a research associate, corrected, and returned to the students.

Two or three times per quarter each student was required to record on tape a short Russian passage containing only material already taught during machine sessions. Immediately after the recording was made it was evaluated for the student by a native Russian with a background in the teaching of the language. Students were informed of any pronunciation defects and advised how to correct them.

Since the computer-based sessions included a coverage of the pronunciation features regularly taught in first-year Russian, no new material on pronunciation was taught to the student during the evaluation of his recording. Rather, his attention was drawn to any points which had already been covered, but which he had failed to master.

Students who wished to discuss their work had access to staff members at the Institute and in the Slavic Division. However, such contacts, which were relatively rare, were always initiated by the student and had nothing to do with the curriculum.

2.7. Supplementary Material

2.7.1. Materials Distributed to Students

The following supplementary materials were written and distributed to the students:

1. A programmed introduction to Russian handwriting, coordinated with the first seven computer-based sessions.
2. A set of summary sheets for individual machine sessions. These sheets included both the grammar and the vocabulary presented in the session. They were generated originally for all sessions except review sessions from session 39 on. The sheets for sessions 1 through 38 are in the revised course.
3. Six pre-examination summaries containing the vocabulary and rules covered up to the midterm or final examination for each of the three quarters. These summaries covered not only material presented during the current quarter, but also material taught in the preceding quarter or quarters.
4. Homework assignments (cf., 2.6. above) coordinated with individual machine sessions. Such assignments were available regularly for all sessions, except a few review sessions beginning with session 8. (The handwriting introduction contained written homework for the first seven sessions.)
5. Response sheets for language-laboratory drills. These were sheets of paper containing the name of the drill and space for the responses.

2.7.2. Materials Not Distributed to Students

These included:

1. Forty audiotapes used for language-laboratory drills.
2. Six videotapes prepared under Professor Suppes's direction.

2.8. The Collection of Data

The data on student performance were recorded in two different forms. The first, discussed in section 2.8.2., was a detailed record of response data for each student in each lesson. The second was a daily summary of student progress.

2.8.1. The Daily Summary

This summary contained the following information for each student: the student's name and number, the number of the session taken on the day in question (if no session was taken, this was also indicated), the percentage of correct responses, the running time in minutes, and the next session scheduled for the student. Examples of daily summaries are found in Appendix 8.

The summaries were used in a number of ways. First, the classroom proctor used the summaries to ascertain which audiotape or tapes would be needed during the coming day's instruction. (As the examples in Appendix 8 show, not all students took the same lesson on the same day.) Second, the sheets also indicated which students, because of illness or other difficulties, fell more than two or three sessions behind the official schedule. Such students were contacted and arrangements were made for the necessary number of make-up sessions.

Third, the summaries were used to evaluate the effectiveness of a given session and, consequently, of new techniques which played a major role in that session. Thus, if a relatively large number of students took more than 50 minutes to finish a particular session, it was clear that the session contained material either too difficult or too voluminous to be handled within the allotted time. This knowledge was useful not only in the revision of the session itself, but also in predicting the average run time necessary for subsequent sessions of similar type and magnitude. Such sessions could then be modified to a more suitable average run time.

The same considerations applied to the percentage of correct responses. Whenever a relatively large number of students had relatively low scores (the minimal score required before the student was allowed to proceed to the next session was 70 per cent correct), it was apparent that the session was too difficult for the students to handle successfully. If, as was sometimes the case, the session was distinguished by the extensive use of a technique not previously employed or not previously used to any significant degree, it was tentatively assumed that the difficulty was attributable to that factor. This hypothesis was tested in one or two following sessions in which the technique in question played as essential a role as in the session where the low scores first appeared. If the scores in those sessions showed similar distributional characteristics, the use of the technique in question was eliminated or reduced in future sessions and in the revision of the session already written. Otherwise, it was assumed that this technique was not in itself unsatisfactory, and the session which did show a large number of low scores was reexamined in the hope of isolating other factors to which the students' difficulties could be attributed.

2.8.2. The Collection and Reduction of Detailed Data

The first quarter of the 1967-68 elementary Russian course was run under the control of programs originally developed for computer-based instruction in mathematics. While the second and the third quarters were run under an independent Russian "driver," the data-collection routines were still those developed for the mathematics driver. Increases in the flexibility and sophistication of the course radically altered the amount and type of data collected, so that it was necessary to modify the data-reduction programs developed for the first quarter's data before processing data collected during the second and third quarters. The original data for the Russian course was recorded, character by character, together with the responses to the other courses run by the drill driver.

The amount of data actually collected was enormous. Even after the characters were combined into the response or responses of each student to each item, approximately 600,000 student-items of great diversity remained. In their raw state, the data were entirely inaccessible, and it became necessary to reduce them to a usable size and format.

The reduced data, which was recorded both in a fixed-record length format (the History File) and in an editable form (the Data Report), contained the following statistics for each item. (The Russian lessons were composed of problems numbered in sequence. A problem could have several parts. The word "item" referred to a part of a problem.)

Problem number and part;

Average latency per character for correct responses;

Average latency per character for wrong responses;

Number and percentage of correct, wrong, and timed-out responses;

Number and percentage of wrong responses correct on second try;

Number and percentage of wrong responses correct on third try.

The latencies were computed only for first-trial responses. After the first quarter, students with scores below 70 per cent had to repeat lessons. Data from the repeated lessons were not included. Appendix 9 consists of three sample summaries from the Data Report, one from each quarter.

The basic record of the Russian course is in this reduced form. The original data are no longer available, because the dozens of tapes containing them were needed for other projects. Tapes and listings of the reduced data have been kept in the project files.

In spite of some difficulties of collection and reduction, the data from the first-year Russian course were of immense value, because they indicated (a) the relative effectiveness of various teaching techniques; and (b) the format in which data should be collected in future research on computer-based language instruction.

Coding the data by item. It was the task of the analyst to find groups of items or relations between such groups that were "meaningful," that is, items useful in predicting the observed performance of the students. The first step in this process was to describe the items expected to be related to student performance.

All items in the lessons selected for analysis were coded by the 15 most important numerical variables. These variables concerned the kind of task demanded of the student and how the item was presented to him (in English, by teletype, etc.); the length of the required response; the form-class of the stimulus and inflectional categories where applicable; an indication of whether or not the item was a repetition of the previous task; and an indication of whether or not the required response was a repetition of the previous response.

The coded data were recorded on magnetic tape and are kept in the project files, together with detailed notes on the assumptions and methods used in the coding. It is in this form that the data were used to obtain the lesson summaries and the analysis of sequential effects described below. With modification, the data would be suitable for much further analysis.

Lesson and quarter summaries. The coded data were first used to obtain a summary view of the entire course. The summaries, by lesson and quarter, are presented in Appendices 4, 5, 6. Many general questions about the course can be answered from them directly. They are also helpful in choosing particular blocks of items for more detailed analysis.

A summary is given for the following lessons.

First quarter: 7-20, 12-16, 18-25, 27, 29, 30, 32, 33, 34, 35, 37, 39-46;

Second quarter: 53, 55-67, 69-77, 79-83, 85, 86-91;

Third quarter: 93, 100, 102, 104, 106, 108, 110, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132.

For the first and second quarters, these were the lessons for which there were usable data for 15 or more students. (Lesson 25 with only 14 students was also included because it was a review lesson.) The data for the third quarter were reduced too late to be coded and analyzed in time for this report. A representative sample of every other lesson of the 34 lessons having data for 15 or more students was chosen.

Definitions and examples of item types. The summaries give student performance statistics for the following major types of problems. The item classification was based on the task demanded of the student. In some cases, several different commands in the script were used to introduce problems of the same type.

1. Type answers to spoken Russian. The student was asked to read a passage in Russian on the teletype. He then heard questions about the passage in Russian which he answered in a specified number of words. Example (abridged from problems 28-31, Lesson 76):

ЧИТАЙТЕ! ... МОЯ ДОЧЬ ПРИЕХАЛА (teletype)
ПОЕЗДОМ ИЗ ЛЕНИНГРАДА. (teletype)
ОТВЕЧАЙТЕ ОДНИМ СЛОВОМ! (teletype)
КАК ОНА ПРИЕХАЛА? (audio)
ПОЕЗДОМ (correct response)

There were only three items where the questions were presented by teletype. These items were classed as "other" for the purposes of the summary.

2. Translate from teletype English. The student was required to type the Russian translation equivalent of the given word, phrase, or sentence. The stimulus item was never spoken. A wide variety of commands was used. Examples are:

(Lesson 70, Problem 112)
COMPLETE.
-PART- ПО-РУССКИ --

(Lesson 106, Problem 56)
COMPLETE. ИНФИНИТИВ СОВЕРШЕННОГО ВИДА
-TO LEAD IN- --

(Lesson 93, Problem 58) ПЕЧАТАЙТЕ ПО-РУССКИ!
WITH FORTY YOUNG LAWYERS

(Lesson 93, Problem 33) НАПЕЧАТАЙТЕ ФРАЗУ ПО-РУССКИ.
I'LL LIE DOWN ON THE BED.

Other commands were "ПЕЧАТАЙТЕ" and, usually at the end of the lesson, "We will now have a vocabulary review" followed by a string of English words with no further explanation.

3. Transcribe from spoken Russian. The student heard a Russian word, phrase, or sentence and was required to type it. The usual command was "Type what you hear."

4. Transform from teletype/spoken Russian. In general, the student heard or saw a Russian word, phrase, or sentence and was required to type a related Russian word, phrase, or sentence according to instructions given to him. There were three subtypes: (a) antonyms, "Type the word with opposite meaning"; (b) form-class transformations, "Type the noun corresponding to the verb"; and (c) all others, which were generally inflectional transformations (e.g., "Give the genitive plural of the following."). The last subclass was similar to certain examples of the last item type, "Inflect teletype Russian." The essential difference was that for an item classed as "Transform" the response had to be written out in full, whereas "Inflect" items, unless a translation was also required, needed only the addition of an inflectional ending. Example:

(Lesson 76, Problem 107)

НАПЕЧАТАЙТЕ ФОРМУ ЖЕНСКОГО РОДА ПРОШЕДШЕГО ВРЕМЕНИ.	(teletype)
ПЬЁТ	(teletype)
ПИЛА	(response)

5. Inflect teletype Russian. This class also contained a number of subtypes. In the most frequent subtype, the student was asked to complete a Russian word with its inflectional ending. The information needed to choose the ending could be given explicitly, as in

(Lesson 68, Problem 13)

COMPLETE МУЗЕЙ, РОД. ПАД. ЕД. Ч. МУЗЕ

Or the student might be required to select the ending from the context, as in

(Lesson 68, Problem 82)

COMPLETE ОТВЕТИТЬ Я ОТВЕ

6. Translate and inflect. Another problem type, subsumed in the summaries under inflection, combined translation and inflection. A Russian context was given, together with an English word or phrase embedded in it. The student was required to translate the English into properly inflected Russian. Examples are:

(Lesson 68, Problem 33)

COMPLETE

ОН ТЕПЕРЬ-WRITES-

and (Lesson 85, Problem 22)

FILL IN

ОН ВСЕГДА -GOES- ПЕШКОМ

These last two examples illustrate one of the problems of classification.

Another fairly infrequent problem type included under inflection was the completion of spelling or morphophonemic rule.

Other item types. Rarely occurring item types were grouped together in a miscellaneous class. Examples of problems called "other" were multiple-choice questions, character-recognition problems, problems related to pronunciation, problems in arithmetic, word recognition from definition.

Preparation of the preliminary analysis. The number, percentage and latency of correct responses were selected for further analysis. To these basic statistics were added the lesson number, total number of student responses and a set of 15 variables expressing the nature of the individual items. These variables were coded in the following way. Working from the lesson scripts, and using a mnemonic alphanumeric code of up to six characters plus two digits, the codes for each item were entered on copies of the Data Report listings. When the statistics of the Data Report appeared to be incorrect, the item in question was rejected, and marked by assigning it the lesson number 1 (no actual data from the first lesson were recorded). The Data Reports were then edited--the unused statistics deleted, new ones added, and the item codes entered. Listings of the edited data were proofread by (usually) the original coder, corrections were made, and the files were then DECtaped. This version of the data is called Revised Data and a listing of it remains in the project files. A total of 85 lessons were prepared in this manner. In general, only lessons with data available for at least 15 students were prepared.

2.9. The Curriculum

A summary of the grammatical material covered in the computer-based course is given in Appendix 10.

In order to achieve a reasonably satisfactory basis for a comparative evaluation of the performances of the computer-based and the regular sections, the grammar and vocabulary presented to the former group were chosen in such a manner as to provide as large an overlap as possible with the material taught to the latter. The text used by the regular sections was the Introductory Russian Grammar by Galina Stilman and William E. Harkins.[1] All the grammar material was taught, but, since the instructors of the regular sections felt that the vocabulary in the text was far too extensive for a first-year course, they compiled a list of those vocabulary items from the book which they felt should be mastered by their own students. The students of the regular sections were informed that only words included in this list need be memorized, and it was this list, and not the total Stilman-Harkins vocabulary, which was used to determine the items included in the computer-based course.

---

[1] Stilman, G., & Harkins, W. E. Introductory Russian Grammar. New York: Blaisdell, 1964.

While the vocabulary overlap was not complete, both the project staff and the instructors of the regular sections felt that a single examination for both groups was justified, because the items learned by both groups constituted a large portion, 85 to 90 per cent, of the total number of words for which the students were held responsible.

The overlap in grammatical material was even greater. Both groups covered all the inflectional material regularly taught during the first year. The sole inflectional category included in Stilman-Harkins, but not taught to the computer-based group, was the present passive participle, a category represented in their material only by two vocabulary items -*ljubimyj*- and -*tak nazyvaemyj*-. On the other hand, two topics--the second genitive and the second locative--were included in the computer-based sessions, although they were mentioned only in footnotes in Stilman-Harkins.

The material covered in any of the six half-terms of the computer-based course was sequenced according to the principal investigator's conception of the most satisfactory programmed presentation. The textbook served only as a general guide in compiling the total list of topics to be included in each half term. In addition, where this was considered conducive to a more satisfactory overall program, some material was introduced earlier in the computer-based course than in the regular sections, while other material was presented much later.

It is clear from the above that the material covered by the computer-based and the regular sections was not entirely identical. As a result, the findings discussed in section 3.1.must be viewed with considerable reservations. Nevertheless, it is true that the examinations given to both groups of students were felt to be a reasonably fair test of their achievements not only by the project staff, but also by the instructors of the regular sections, and that until further research is possible, our findings, though they leave much to be desired, represent the only comparative evidence of this type in existence.

Chapter 3

Findings and Analysis

3.1. Comparative Results of the Examinations

All midterm and final examinations conformed to the standard requirements of Stanford University for courses meeting five hours a week. These were (a) that the midterm examination be one academic hour (i.e., 50 minutes) in length, and the final examination be two full hours (i.e., 120 minutes); (b) that the examination not be identical to previous examinations in the same course; and (c) that the students not see the examination in advance.

Because of unavoidable differences in the sequencing of vocabulary and grammatical material, the examinations for the first two quarters and the spring midterm were divided into a "common portion," given to both groups, and a section which included material covered only by the group to which it was given. The spring final was entirely identical for both groups.

The text of the common portion of the first two final examinations and the complete text of the spring final are given in Appendix 11. While no claim is made that the common portion of the examinations constituted a completely objective criterion for the evaluation of the relative achievements of the computer-based and regular sections, efforts were made to prevent an overly great bias in favor of either group. Thus, during the first two quarters, the project staff prepared the common portion of one midterm and one final examination, while the instructors of the regular courses prepared the common portion of the other final and midterm. In each case, the group which prepared the material submitted it for modification to the other group before the final copy was typed. In the third quarter, each group contributed approximately 50 per cent of the material on both the midterm and the final examinations.

3.1.1. The Fall Quarter

Approximately 66 per cent of both the midterm and the final examinations for the autumn quarter were identical, both for the computer-based and for the regular Russian 1 sections. Table 1 of Appendix 7 shows the results for the midterm; Table 2 for the final. As is clear from Table 1, the midterm performance of the computer-based group was in no way superior to that of the regular students. The computer-based group, however, greatly excelled the regular group on the final. Thus, the average number of errors for the regular group was three times greater than that for the computer-based group. Fourteen out of 28 students in the regular group made more errors than did the poorest student in the computer-based group. Of 13 students who made fewer than 10 errors, 12 were in the computer-based group, while of 23 students making fewer than 20 errors, 19 were in the computer-based group.

3.1.2. The Winter Quarter

Approximately 66 per cent of both the midterm and the final examinations for the winter quarter were identical both for the computer-based and for the regular Russian 1 sections. Table 3 of Appendix 7 shows the results from the midterm, Table 4 shows those for the final.

While the performance of the computer-based group continued to be superior to that of the regular group, the most striking difference was in the number of students who completed the second quarter. Although (cf., Appendix 3) only 26 of the original 30 computer-based students remained, a much larger portion of students remained in the computer-based group than in the regular group. Since students who fail to complete at least one year of college Russian know too little to use the language effectively, it would appear that computer-based instruction would avoid much of the wasted time and effort which mark present-day university language courses.

3.1.3. The Spring Quarter

Approximately 80 per cent of the midterm examination was identical for both the computer-based and the regular groups. The final examination was completely identical for both groups. Table 5 of Appendix 7 shows the results for the midterm; Table 6 shows the results for the final examination.

While the computer-based group did only slightly better on the midterm (cf., 3.1.4.), their performance on the final which covered the entire year's material was significantly superior to that of the regular students.

The results for this final examination are particularly interesting in that they include performance data for the sole student who abandoned the computer-based course for the regular section. At the end of the second quarter, this student expressed dissatisfaction with the computer-based course and obtained the permission of an instructor in one of the regular sections to transfer to that group. As seen in the results of the spring final examination, the student was unable to perform successfully in a regular classroom setting.

The significance of his failure is unclear. On the one hand it might be seen as an indication that computer-based instruction, repugnant as it was to the student, was a major factor in his success in dealing with the work of the first two quarters. On the other hand, it might be viewed as a sign that the students in the regular sections developed a set of learning techniques for dealing with the materials of their course which the computer-based students did not acquire. Since either of these possibilities would, if correct, be of great significance in the evaluation of the effectiveness of computer-based instruction, one may hope that the future research will focus on questions of this type.

As is shown by columns 2 and 4 of Table 6, the two students who joined the computer-based course at the beginning of the winter quarter were counterbalanced by three students who joined the regular sections at the beginning of the third quarter (for their history, see Appendix 3). It follows that of the 30 students who began the computer-based course, 22, or 73-1/2 per cent successfully completed the entire three quarters of the course. Of the 38 students who entered the regular sections, only 12, or less than 33-1/3 per cent, completed three quarters. Even if the eight students who left the regular course before the end of the first quarter are disregarded, thus obtaining an initial enrollment of 30 for both groups, only 40 per cent of the regular group completed the course.

The consistently superior performance of the computer-based group is even more impressive in light of these statistics. A large number of the students who left the regular course did so because they were unable to perform satisfactorily. Since, as Appendix 3 shows, 7 of the 8 students who left the computer-based course did so for other reasons, it is not improbable that the 12 students who completed three quarters on a regular basis represented a much more gifted group than the group of 22 who completed three quarters of computer-based work. The failure of this small, select group of "survivors" to surpass the larger computer-based group, which had not been subjected to any significant "weeding-out" process based on the quality of past performance, was particularly encouraging.

3.1.4. Midterm Examination Results versus Final Examination Results

It is particularly interesting to compare the results of the midterm examinations with those of the finals in each of the three quarters. The average number of errors was practically identical for both groups on the midterm examinations. On each of the three finals, however, the computer-based group did significantly better than the regular group.

We feel that these facts are not the result of mere chance, but represent a striking illustration of one of the basic advantages of computer-based instruction as compared with regular classroom instruction--the fact that the former constitutes a much more efficient apparatus for the review of a large amount of previously learned material than does the latter. Thus, while the 50-minute midterm examinations centered primarily around vocabulary and grammar material introduced in the immediately preceding month or five weeks, the final examination included not only the material covered throughout the entire quarter, but also, in the case of the winter and spring terms, a great deal of material introduced earlier. In the classroom, it is extremely difficult, if not impossible, to ascertain in detail which of a large number of words or rules has been forgotten by which student or students. A computer-based review of the same body of vocabulary and grammar provides each individual student with detailed indications as to exactly which items he has forgotten and needs to review. If he follows these indications conscientiously, and if the time gap between the review and the examination is not too large, his chances of success are extremely good.

3.2. The Division of Labor Between Computer-based Sessions and Supplementary Activities

During the fall quarter, as a result of the information provided by the daily summaries discussed in 2.8., the scores of the midterm and final examinations, and feedback from student comments, a number of hypotheses concerning the most efficient utilization of computer-based instruction in the teaching of foreign languages gradually evolved. These hypotheses, which were to some extent confirmed by the success of instruction during the winter and spring quarters, attempted to define the optimal division of labor between computer-based and non-computer-based activities under the conditions governing work on the 1967-68 course. While a more sophisticated set of instructional devices (display consoles, light pens, etc.) might result in a different approach, the principles outlined below would be applicable to any computer-based language course employing the devices discussed in 2.3. above.

3.2.1. Division of Labor Between the Computer and the Language Laboratory

As the course progressed, it became apparent that certain activities which in the first lessons had been included in the computer-based sessions would be more effectively handled if relegated primarily to the language laboratory. This was particularly true of dictated sentences and responses to questions about material presented orally. These items proved much harder to type than to write down. Since all material to be checked by the computer had to be typed, the second half of the first quarter saw a gradual reduction in the length and number of such items in the computer-based lessons. However, other audio-lingual activities such as reading sentences after the speaker, responding to questions about typed material, or simply saying Russian sentences and then checking them against the tape, were retained as part of the computer-based lessons. As things now stand, the student acquires the correct pronunciation of vocabulary items and a basic acquaintance with spoken Russian in his computer-based sessions. He extends this knowledge and undergoes extensive testing on his ability to comprehend spoken Russian in the language laboratory. His pronunciation is tested by the evaluation tapes described earlier.

3.2.2. Division of Labor Between the Computer and Written Homework

It became clear during the first few weeks of the course that the computer was much more effective in handling smaller, more closely knit constructions than in dealing with long sentences or paragraphs. It was, therefore, decided to use the computer-based sessions primarily for the introduction and drilling of "building blocks" (i.e., sentence constituents) and to leave extensive work with long Russian sentences to the homework assignments. The results of the final examinations seemed to bear out the validity of the assumption underlying this approach, i.e., that a student who has mastered the production of sentence constituents thoroughly will have little difficulty in producing sentences composed of those constituents. While complete sentences are, of course, included in the computer-based sessions, they are generally given only after the student has performed intensive drill work on any new sentence components they may involve. Even under these conditions, sentences to be typed during the computer-based sessions were generally short and centered around one or two key constructions which were among the topics of the given lesson.

On the other hand, the number of sentences included in the written homework was significantly increased and special efforts were made to make sure that these sentences called for constructions covered not only by current lessons, but also by previous work. As things stand now, the computer's job is primarily teaching vocabulary items and grammatical constructions. The integration of new vocabulary items and grammatical patterns into previously assimilated material is accomplished more effectively by written homework.

3.2.3. Division of Labor Between the Computer and Lesson Summaries

Perhaps the most striking change which took place during the course of the first quarter's work was the role played by summaries for outside study. During the first 27 lessons, no outside summaries were given, and students wishing to review material had to do so on the basis of the printout of their computer-based sessions. It soon became apparent that such an approach tended to decrease the effectiveness of the computer-based course, since the student had to create his own material for outside study. Between the first of December and the final examination for the fall quarter, lesson summaries were provided for each new lesson, and a final summary was provided covering the material of the entire quarter. Furthermore, during the final week's review, instead of providing the students with the correct answers to the review problems they missed, the computer simply told them to review a given rule or rules. The results of the fall final examination indicated that this approach was highly successful, and it was continued throughout the year.

Thus, the computer's role in reviewing material is that of a tutor who assesses a student's performance and, when necessary, directs him to the proper portion of his summary sheets. At following sessions the student is again tested on any items missed and informed whether more study is needed.

3.3. Findings of the Preliminary Data Analysis

The methods for collection and reduction of data, and the preparation of a preliminary analysis are discussed in section 2.8.

3.3.1. Lesson Summary Statistics

The number of items, average percentage correct, and mean and standard deviation of the correct latency appear for each category in the summary. The average percentage correct was the sum of the percentage correct for each item divided by the number of items in the category. The average correct latency was the sum of the latency per character for the correct responses for each item divided by the number of items. The standard deviation was computed from the formula

$$\sqrt{(\Sigma L^2 - (\Sigma L/N)^2 / N-1)} ,$$

where L was the item latency and N X was the number of items.

3.3.2. Observations from Lesson Summaries

Over the year, the percentage correct was very close to 80 per cent. A quick inspection showed that the variation from lesson to lesson was adequately controlled. Only five lessons (13, 19, 37 (examination), 91, 93) fell outside the range of 70 to 90 per cent, and the great majority was between 75 and 85 per cent.

In general, the comprehension task ("Type Answers") was the most difficult; the average correct was 72 per cent. Inflection was the easiest at 84 per cent. This last figure is deceptive, however, as can be seen from the analysis in section 3.3.3.

No obvious trends appeared, except in the case of transcription, for which the quarter totals were the ascending sequence 75, 91, and 94 per cent. It is probable that this reflected a gradual improvement in student performance, as inspection of the lesson summaries shows. For approximately the first 10 lessons, the average correct was 70 per cent, climbing to near 80 per cent for the rest of the quarter. Greater familiarity with the Russian alphabet and teletype keyboard may account for this increase. There was a second jump to the level of the second quarter, within which there was a rather small upward trend. This was due to the introduction early in the second quarter of computer program routines that permitted the student to inspect and correct his response before submitting it to the computer for correction.

The comparison of visual and aural stimuli was possible only for the transform items. The visually presented items were easier, as would be expected.

3.3.3. Analysis of Sequential Effects

The effect of the preceding item upon the difficulty of a given item was found to be significant in the Institute's computer-based instruction of arithmetic and other subjects. Preliminary inspection of the data indicated that this effect was also present in the Russian course. Accordingly, we chose to complete the data analysis for the reporting period with a preliminary investigation of sequential effects.

Two variables, "type" and "content," were considered. Every item was either a repetition of the type of previous item ("same type") or not ("different type"), and the response to an item was either the same as that to the preceding item ("same content") or not ("different content"). Thus, every item belonged to one of four classes thus defined.

The intuitive notion behind these variables was simple enough. It was presumed that a student's performance was adversely affected by a shift to a new task ("different type"). Further, it was presumed that there was a tendency to repeat the previous response.

3.3.4. Criteria for Defining Different Item Types

The following partition of items was used to define different items. It represents only our first hypothesis of a meaningful partition, and it is likely that modifications would be desirable for more detailed analysis.

Type answers to teletype Russian;

Type answers to spoken Russian;

Translate English word;

Translate English phrase or sentence;

Transcribe character;

Transcribe word;

Transcribe phrase or sentence;

Transform spoken word--antonym;

Transform spoken word--form class;

Transform spoken word--inflection;

Transform spoken phrase or sentence--inflection;

Transform teletype word--antonym;

Transform teletype word--form class;

Transform teletype word--inflection;

Transform teletype phrase or sentence--inflection;

Inflect from context;

Inflect from explicit instructions;

Translate and inflect;

All other types.

The classes "Translate English word" and "Translate English phrase or sentence" were counted as the same type if they both occurred in a list with common instructions. At times, an explanation intervened between items of the same type. The second item was then coded as "different type."

3.3.5. Criteria for Defining Different Content

An item was coded "same content" if its response was the same as that of the previous item. (A morphonemic variant was not the same.) Where problems had several parts, a response could be the same as the response to the corresponding part of the preceding problem, but not the same as that to the preceding item (preceding part of the same problem). Such items were coded as "same content."

For "Transform inflection" items, the same inflection was required for different stems. In general, if no stem modification was required, such items were coded as "same content."

One deviation from these criteria was made. For nominal inflections, if the responses of two consecutive items were the same, but different cases were required, the second item was coded as "different content." This was an arbitrary decision, whose validity could presumably be decided from the data themselves. It reflected our impression that the "copying effect" of a previous response would be largely neutralized by the request for a different case. In practice, the problems were so arranged that a change in case almost always implied a change in form.

3.3.6. Item Categories

The item categories were changed slightly from those used for the lesson summaries. "Type answers," "Translate," and "Transcribe" remained the same. Because items of the same content occurred almost exclusively with the items requiring inflection, the previous "Transform inflection" classes were subdivided to reflect this. Instead of splitting the "Transform" items according to whether the stimulus was spoken or typed, the antonym and form-class transforms were opposed to the inflectional ones. The "Inflect" items also requiring translation of an English element were split off from the rest. "Inflect Rule," as well as the miscellany of "Other Types," was not treated.

The statistics were computed over seven blocks of lessons: 1-19 (11 lessons); 20-33 (11 lessons); 34-46 (11 lessons); 47-65 (12 lessons); 66-79 (12 lessons); 80-92 (11 lessons); and 93-135 (17 lessons).

The summaries of the analysis are presented in Appendix 12. The statistics were computed as in the lesson summaries, except that the sample variance was used instead of its square root, and the sample variance was also computed for the average correct percentage.

3.3.7. Observations about Sequential Effects

For the "Transform inflection" and "Inflect" items, the effect of repeating an item with the same response ("Same Content") was striking. The "Inflect" items with the same content consistently had an average correct of about 95 per cent, with the "Translate" and "Inflect" and the "Transform-Inflection" items slightly lower. This means that on the average, only one student made a mistake on these items. This suggests that perhaps such repetition was unnecessary and inefficient. In fact, this conclusion was anticipated by the author of the course and, as the data show, the proportion of such repetition was greatly reduced during the course of the year.

Contrary to our expectations, there seems to be no indication that the appearance of a new type of problem exercised a predictable effect on student performance. It is, of course, conceivable that a significant effect was masked by uncontrolled variation.

This may seem surprising in view of the obvious differences between the "same" and "different" columns for "Translate" and "Transcribe" items. It is just these items, however, which show the greatest variation in response length. Furthermore, the translation and transcription of phrases and sentences tended to occur as single items while words occurred in blocks. Thus, the harder, longer items tended to dominate the "different type" category. This explanation seems the more plausible since no marked difference between the items of "same" and "different" types turned up consistently for the other item classes where the variation in length of response was small.

Apart from the sequential effects, the analyses revealed that the Translate-and-Inflect items were markedly more difficult than the Inflect items. It was naturally expected that items with an added task were more difficult than without. The shorter correct latencies are probably in part explainable by the greater number of characters in the responses to the Translate-and-Inflect items, so that the effect of the latency to the first character was distributed over more units in the average. It should be noted that the extra task of "translation" was not homogeneous. The added difficulty could have been a stem modification, use of words in given contexts (i.e., verbs of motion), as well as simple word-for-word translation from English to Russian.

3.3.8. Areas for Further Research

No further analysis could be completed during the reporting period. As they stand, the data present rich opportunities for further research. The study of the difficulty of comprehension items, the nature of the learning of inflectional patterns and vocabulary learning should be particularly fruitful.

The learning of an inflectional system is of great interest to the linguist and psychologist. The linguist finds this a likely area to test theories of language structure, and the psychologist to test theories of concept learning. It is felt that the present data are particularly valuable for this area. First, Russian is a highly inflected language whose structure has been extensively studied. The native language of the students, English, is probably as desirable as any, since its inflectional system is rudimentary. The major problem in studying the acquisition of an inflectional system is that it cannot be studied easily in bits and pieces, since the interactions within the entire system constitute one of the principal interests. Here, however, we have the good fortune to possess data on the learning of the entire nominal inflectional system of Russian by a homogeneous group of students.

Past speculations about the learning of inflections have been limited to the listing of pertinent factors, one or more of which can usually be invoked to explain learning difficulties. What is needed, and what may well be obtained from the present data, is an indication of the relative importance of such factors in given circumstances and the interaction among the factors and circumstances.

Chapter 4

Conclusions

4.1. Goals Achieved and Suggestions for Further Research

The main objective in developing and implementing a computer-based course in first-year college Russian was to ascertain the extent to which such a course provided a desirable alternative to regular classroom instruction. The findings discussed in section 3.1. indicate that, at least insofar as the translation of English sentences into Russian is concerned, computer-based instruction is probably more effective than a regular classroom-taught course. Although it would be desirable to investigate this question on a wider scale than was possible in the present case, there is every reason to believe that the introduction of computer-based instruction in elementary language courses in which the acquisition of writing plays an important role would greatly improve the effectiveness of those courses.

The set of principles discussed in section 3.2. constitutes a first step in the direction of a general theory concerning the optimal utilization of computer-based sessions in second-language learning. The development of the "building-blocks" concept as the fundamental notion underlying the division of labor between such machine sessions and supplementary, non-computer-based activities has, we feel, provided other scholars concerned with the creation of computer-based language courses with a fruitful way of approaching this problem. While this area too needs further investigation, there is every reason to anticipate that the general strategy evolved during the work on this project will prove a successful one.

The results of the analysis of the detailed data were necessarily preliminary in character. However, useful summaries of main aspects of the course were made and will be helpful to anyone doing further work in this area.

4.2. Disposal of Course Materials and Detailed Data

The printout of the full text of the computer-based sessions (10 volumes including more than 300 pages each), the handwriting booklet, the homework assignments and study sheets, the pre-examination summaries, the printout of the reduced data described in 2.8. (some 350 pages), and a complete set of all audio and video tapes made in connection with this project are on file at the Institute for Mathematical Studies in the Social Sciences, where they will be made available to scholars interested in a firsthand acquaintance with these materials.

In consideration of this fact, these materials will not accompany the final report.

Appendix 1

The Coding of Input for Computer-based Sessions

Lessons are coded in a shorthand coding hereafter referred to as "input code." This is the basic format used to specify lessons. A standard transliteration will be employed.

Russian preprocessor I (RP-I) is used to convert this text to a format that can be listed with the Russian lister on teletypes with Russian characters. These listings are used as a script for recording the audio.

Russian preprocessor II (RP-II) converts this "listable code" into "run-time code" for the main program.

Examples of raw and processed input follow.

```
INPUT OP-CODES

INPUT     <IF PRECEDED BY -REM- WILL BE TREATED AS A TEST

BB        KNIG(A)+    <PLUS MEANS NEW ITEM ON NEXT LINE
          DAM(A)      <LAST ITEM DOES NOT HAVE A PLUS
                      <NO LIMIT TO NUMBER OF ITEMS
OUTPUT
TRY       1
GAA       1
TE        COMPLETE.
LR        KNIG(A)
LR        DAM(A)
RET       2
-------------------------
INPUT     <REMEDIAL --- -BB- USED AS A TEST

REM       RULE XX+
BB        KNIG(A)+
          DAM(A)

OUTPUT

TRY       1
GAA       1
TE        COMPLETE.
TST       1
LR        KNIG(A)
BLK       .
RET       1
TE        REVIEW RULE XX
FIN       .
TST       1
LR        DAM(A)
BLK       .
RET       1
TE        REVIEW RULE XX
FIN       .
RET       2
---------------------
BC        SAME AS -BB- EXCEPT COMPLETE OMITTED-,TAKES -REM-
```

```
INPUT OP-CODES (CONT.)

INPUT     <DOES NOT TAKE <REM>

D         BRAT+       <ONLY ONE ITEM ALLOWED
          BROTHER     <PLUS MEANS OPTIONAL ENG. TRANSLATION

OUTPUT

TRY       1
SAA       1
TE        READ ALOUD
RET       1
TR        BRAT
RET       1     <OMITTED IF ENG. TRANS. DOES NOT FOLLOWED
TE        BROTHER     <OPTIONAL
RET       2
==============================
DM        <SAME AS <D> EXCEPT USES DIFFERENT INSTRUCTIONS
TE        READ AFTER ME
=========================
INPUT     <DOES NOT TAKE <REM>
DMS       ON+   <SAME INPUT PATTERN AS <D>
          HE
OUTPUT
TRY       1
SAA       1
TR        PROCITAJTE FRAZU ZA MNOJ.
RET       1
TR        ON
AR        ON
WAT       20    <PROGRAM CALCULATES WAIT TIME
RET       1
TE        HE    <OPTIONAL AS IN <D>
RET       2
=============================
DMR       <SAME AS <DMS> EXCEPT USES DIFFERENT INSTRUCTIONS
TR        CITAJTE ZA MNOJ.
=========================
INPUT
EQ        BRAT+       <ONLY ONE ITEM ALLOWED-NEEDS PLUS
          BROTHER     <TRANS. ALWAYS FOLLOWS
OUTPUT
AR        BRAT/ MEANS BROTHER
RET       1
TR        BRAT    /BROTHER
RET       2
=====================
INPUT    <DOES NOT TAKE -REM- YET
FD       PIS;M(O)+  <STEM(ENDING) --NEEDS PLUS
         NOI+       <3 CHAR. CODE FOR TABLE--NEEDS PLUS
         PS, IS, GS, AS,    <1-10 TWO CHAR. SYMBOLS
                            <ALWAYS FOLLOWED BY A COMMA

OUTPUT
TRY      1
GAA      1
TE       COMPLETE THE FOLLOWING FORMS OF[PIS;MO
LE       P.S.   PIS;M(E)
LE       I.S.   PIS;M(OM)
LE       G.S.   PIS;M(A)
LE       A.S.   PIS;M(O)
RET      2
--------------------------
INPUT TAKES -REM-, ANY NO. OF ITEMS, IF -SR- IS LONGER THAN
         ONE LINE ANSWER MUST BE ON LAST LINE OF -SR-

F        ]TA ULIC(A) OHEN; GR>SN(A>).+
         > NE UME(<) HITAT; PO-RUSS(KI).

OUTPUT

TRY      1
GAA      1
TE       FILL IN.
SR       ]TA ULIC(A) OHEN; GR>SN(A>).
SR       > NE UME(<) HITAT; PO-RUSS(KI).
RET      2
----------------------------------------------------
INPUT DOES NOT TAKE -REM- SERIES, ANY NO. OF ITEMS

FSA      VY BYLI VHERA NA LEKC(II)?+
         U ]T(IX) MOLOD(YX) L<DEJ MNOGO KNI(G).

OUTPUT

TRY      1
GAA      1
AE       LISTEN TO WHAT I SAY THEN FILL IN THE BLANKS.
AFR      VY BYLI VHERA NA LEKCII?
SR       VY BYLI VHERA NA LEKC(II)?
AFR      U ]TIX MOLODYX L<DEJ MNOGO KNIG.
SR       U ]T(IX) MOLOD(YX) L<DEJ MNOGO KNI(G).
RET      2
----------------------------------------------------
```

```
INPUT NO -REM-, ONE ITEM ONLY

L         DAMA

OUTPUT

TE        LISTEN.
RET       1
TR        DAMA
AR        DAMA ...
          DAMA
RET       2
-----------------------------------------------------
INPUT
LCE       (D) A'(M) A+
          LADY

OUTPUT
TRY       1
GAA       2
TE        LISTEN.
AR        DA'MA
          DA'MA
TE        LISTEN AGAIN, THEN COMPLETE THE WORD.
AR        DA'MA
          DA'MA
TST       1
SR        (D) A'(M) A
BLK       .
RET       1
TE        COPY THE NEW WORD WITHOUT THE STRESS.
LR        (DAMA)
FIN       .
RET       1
TR        DA'MA/MEANS -LADY-
RET       2
--------------------------------
```

```
INPUT
LGE      DA'MA+
         LADY

OUTPUT
TRY      1
GAA      1
TE       LISTEN CAREFULLY.
AR       DA'MA
         DA'MA
TE       LISTEN AGAIN AND THEN TYPE THE NEW WORD.
AR       DA'MA
         DA'MA
TST      1
NLR      (DAMA)
BLK      .
RET      1
TE       NOTE THAT[DA'MA/CONTAINS NO NEW SOUNDS OR LETTERS.
         COPY IT.
NLR      (DAMA)
FIN      .
RET      1
TR       DA'MA MEANS -LADY-
RET      2
-----------------------------------
```

```
INPUT NO -REM-, ONE ITEM ONLY

O        MAL;HIK

OUTPUT

TE       OBSERVE
RET      1
TR       MAL;HIK
RET      2
-----------------------
INPUT NO -REM-, ONE ITEM ONLY

R        KARTINA

OUTPUT

TE       REPEAT.
RET      1
TR       KARTINA
AR       KARTINA...
         KARTINA...
RET
--------------------
RMS      SAME AS -DMS- EXCEPT RUSSIAN INSTRUCTIONS
TR       POVTORITE FRAZU ZA MNOJ.
```

```
INPUT DOES NOT TAKE -REM-, ANY NO. OF ITEMS

S        HE IS SICK.+
         ON BOLEN.

TE       SAY--HE IS SICK.
WAT      30
AR       ON BOLEN.
RET      2
----------------------
SRR      SAME AS -S- EXCEPT RUSSIAN INSTRUCTIONS
TR       SKAQITE PO-RUSSKI--/WHERE IS BORIS?
----------------------------
INPUT DOES NOT TAKE -REM- ANY NO. OF ITEMS

SA       GDE VY BYLI VHERA?+
         NA LEKCII+
         A GDE BYL VAW MUQ?+
         NA SOBRANII

TE       SAY THE ANSWER.
RET      1
TR       GDE VY BYLI VHERA?
AR       NA LEKCII
RET      1
TR       A GDE BYL VAW MUQ?
AR       NA SOBRANII
RET      2
---------------------
```

```
INPUT DOES NOT TAKE -REM-, ANY NO. OF ITEMS

SOW     VY ID←TE NA KONCERT?+
        DA.+
        A BORIS ID←T?+
        NET.

TE      SAY A ONE WORD ANSWER.
RET     1
TR      VY ID←TE NA KONCERT?
AR      DA.
RET     1
TR      A BORIS ID←T?
AR      NET.
RET     2
-----------------------------
INPUT DOES NOT TAKE -REM-, ANY NO. OF ITEMS

SOP     UMNYJ+
        GLUPYJ+
        KRASIVYJ+
        NEKRASIVYJ+
        BOL;WOJ+
        MALEN;KIJ
TE      SAY THE WORD WITH THE OPPOSITE MEANING.
RET     1
TR      UMNYJ
AR      GLUPYJ
RET     1
TR      KRASIVYJ
AR      NEKRASIVYJ
RET     1
TR      BOL;WOJ
AR      MALEN;KIJ
RET     2
---------------------
```

```
INPUT
SRM     SPECIAL REMEDIAL ROUTINES
        VARIED INPUT
        <NOTE THAT -IS, ARE, THE, A, AN- ARE AUTOMATICALLY
        ELIMINATED FROM STORED INPUT AND THUS ARE NOT
        COUNTED WHEN CODING THE SENTENCE

        MOMMA IS AT?HOME.+      <-AT- IS COUNTED AS WORD 2
        MAMA DOMA       <AND STORED WITH WORD 3 AS ONE UNIT

        WE WRITE.+
        MY PI(WEM,SAT:,WUT)+
        2VA1PVPR1

        IVAN IS READ(ING,) AN INTERESTING BOOK TO BORIS.+
        IVAN HITA(ET,T:,<T) INTERESN(U<,YJ) KNIG(U,A)
        BORIS(U,)+          <NOTE ZERO CODING FOR 2ND ENDING
        2VA3SVPR1, 3AFAAFS, 4NASNAA, 5NDSNSD

        HE IS L(YING,IE)?DOWN.+
        ON LEQ(IT,AT:,AT)+
        2VN3SRULE
```

```
INPUT DOES NOT TAKE -REM-, ONLY ONE SENTENCE ALLOWED
          NOT TO EXCEED 9 RUSSIAN WORDS

SRM       MOMMA IS A LADY.+
          MAMA DAMA

OUTPUT
TRY       1
GAA       2
TST       1
TE        TYPE IN RUSSIAN.
          MOMMA IS A LADY.
NLR       (MAMA ) (DAMA)
BLK       1
TRY       1
GAA       1
RET       1
TST       1
LE        THE BASIC FORM OF -MOMMA- IS ( (MAMA)
BLK       .
RET       1
TE        REVIEW THIS WORD IN YOUR VOCABULARY.
FIN       .
FIN       .
BLK       2
TST       1
LE        THE BASIC FORM OF -LADY- IS( (DAMA)
BLK       .
RET       1
TE        REVIEW THIS WORD IN YOUR VOCABULARY.
FIN       .
FIN       .
BLK       .
RET       1
TRY       2
GAA       1
TE        TRY THE SENTENCE AGAIN.
NLR       (MAMA DAMA)
FIN       .
RET       2
```

```
INPUT TAKES -REM-, ANY NO. OF ITEMS

T         WHERE ARE YOU FLYING?+
          KUDA VY LETITE?

TRY       2
GAA       1
TE        TYPE IN RUSSIAN.
RET       1
TE        WHERE ARE YOU FLYING?
NLR       (KUDA VY LETITE?)
RET       2
-----------------------------
TRR       SAME AS -T- EXCEPT RUSSIAN INSTRUCTIONS
TR        PEHATAJTE PO-RUSSKI!
--------------------------
TRZ       SAME AS -T- EXCEPT INSTRUCTIONS OMITTED
--------------------
INPUT TAKES -REM- , ANY NO. OF ITEMS.+

TSR       SHE IS HOME.+
          ONA DOMA

TRY       2
GAA       1
TR        NAPEHATAJTE FRAZU PO-RUSSKI./
TE        SHE IS HOME.
NLR       (ONA DOMA)
RET       2
-----------------------------
```

```
INPUT
ICI       MOMMA+
          MAMA+
          YES+
          DA

OUTPUT
TRY       !
GAA       !
TE        TYPE IN RUSSIAN
TST       !
TE        MOMMA
NLR       (MAMA)
BLK       .
RET       !
TE        COMPLETE THE WORD FOR MOMMA
SR        (M) AM(A)
SR        M(AM) A
TE        NOW TYPE THE WHOLE WORD.
NLR       (MAMA)
FIN       .
TE        TYPE IN RUSSIAN
TST       !
TE        YES
NLR       (DA)
BLK       .
RET       !
TE        COMPLETE THE WORD FOR YES
SR        (D) A
TE        NOW TYPE THE WHOLE WORD.
NLR       (DA)
FIN       .
-------------------------------
```

```
INPUT TAKES -REM-, ANY NUMBER OF ITEMS

THW       OKNO*
          WINDOW*
          DVER$*
          DOOR*
          SAMOL=T*
          AIRPLANE

TRY       2
GAA       1
TE        TYPE
AFR       OKNO
          OKNO
LR        (OKNO)
RET       1
TE        WINDOW
AFR       DVER$
          DVER$
LR        (DVER$)
RET       1
TE        DOOR
AFR       SAMOL=T
          SAMOL=T
LR        (SAMOL=T)
RET       1
TE        AIRPLANE
RET       2
===================
TWR       SAME AS -THW- EXCEPT RUSSIAN INSTRUCTIONS
TR        PECHATAJTE!
====================
INPUT DOES NOT TAKE -REM-, ONLY ONE ITEM ALLOWED

THS       MO> BABUWKA UEXALA.*
          MY GRANDMOTHER LEFT.    -ENG. TRANSLATION OPTIONAL

TRY       2
GAA       1
TE        TYPE
AR        MO> BABUWKA UEXALA.
          MO> BABUWKA UEXALA.
LR        (MO> BABUWKA UEXALA.)
RET       1
TE        MY GRANDMOTHER LEFT.
RET       2
===================
THR       SAME AS -THS- EXCEPT RUSSIAN INSTRUCTIONS
TR        PECHATAJTE!
=========================
INPUT DOES NOT TAKE -REM-, ANY NO. OF ITEMS ALLOWED

TOP       MAL;CHIK*
          DEVOCHKA*
          XOROSHIJ*
          PLOXOJ

TRY       2
GAA       1
TE        TYPE THE WORD WORD WITH THE OPPOSITE MEANING.
RET       1
TR        MAL;CHIK
NLR       (DEVOCHKA)
RET       1
TR        XOROSHIJ
NLR       (PLOXOJ)
RET       2
======================
INPUT DOES NOT TAKE -REM-, ANY NO. OF ITEMS ALLOWED

TTT       GDE VY ZIV=TE?*
          V MOSKVE*
          KUDA VY LETITE ZAVTRA?*
          V LENINGRAD.

TRY       2
GAA       1
TE        TYPE THE ANSWER.
AR        GDE VY ZIV=TE?
          GDE VY ZIV=TE?
LR        (V MOSKVE)
AR        KUDA VY LETITE ZAVTRA?
          KUDA VY LETITE ZAVTRA?
LR        (V LENINGRAD.)
RET       2
=========================
TIR       SAME AS -TTT- EXCEPT RUSSIAN INSTRUCTIONS
TR        OTVECHAJTE NA TELETYPE
=========================
INPUT DOES NOT TAKE -REM-, ANY NO. OF ITEMS

T1W       TU ID←W; NA SOBRANIE?+
          DA+
          A KAT>?+
          NET

TRY       2
GAA       1
TE        TYPE ONE WORD ANSWERS.
AR        TU ID←W; NA SOBRANIE?
          TU ID←W; NA SOBRANIE?
LR        (DA)
AR        A KAT>?
          A KAT>?
LR        (NET)
RET       2
-----------------------
T1R       SAME AS -T- EXCEPT RUSSIAN INSTRUCTIONS
TR        OTVEHAJTE ODNIM SLOVOM.
-------------------------
T2W       KUDA MAWA EDET?+
          V WKOLU.+
          ONA EDET AVTOBUSOM?+
          NET, PEWKOM.

TRY       2
GAA       1
TE        TYPE TWO WORD ANSWERS.
AR        KUDA MAWA EDET?
          KUDA MAWA EDET?
LR        (V WKOLU.)
AR        ONA EDET AVTOBUSOM?
          ONA EDET AVTOBUSOM?
LR        (NET, PEWKOM.)
RET       2
-------------------------
T2R       SAME AS -T2W- EXCEPT RUSSIAN INSTRUCTIONS
TR        OTVEHAJTE DVUM> SLOVAMI.
---------------------
```

```
INPUT DOES NOT TAKE -REM-, ANY NO. OF ITEMS

T3W       KOGDA PRILETIT SAMOL←T?+
          V DVA HASA.+
          A KOGDA ULETIT?+
          V POLOVINE P>TOGO.

TRY       2
GAA       1
TE        TYPE THREE WORD ANSWERS.
AR        KOGDA PRILETIT SAMOL←T?
          KOGDA PRILETIT SAMOL←T?
LR        (V DVA HASA.)
AR        A KOGDA ULETIT?
          A KOGDA ULETIT?
LR        (V POLOVINE P>TOGO.)
RET       2
------------------------
T3R       SAME AS -T3W- EXCEPT RUSSIAN INSTRUCTIONS
TR        OTVEHAJTE TREM> SLOVAMI.
------------------------
INPUT DOES NOT TAKE -REM-, ANY NO. OF ITEMS

T4W       GDE KAT>?+
          ONA POWLA K BORISU.+
          ONA SKORO PRID←T?+
          V P>T; S POLOVINOJ.

TRY       2
GAA       1
TE        TYPE FOUR WORD ANSWERS.
AR        GDE KAT>?
          GDE KAT>?
LR        (ONA POWLA K BORISU.)
AR        ONA SKORO PRID←T?
          ONA SKORO PRID←T?
LR        (V P>T; S POLOVINOJ.)
RET       2
------------------------
T4R       SAME AS -T4W- EXCEPT USES RUSSIAN INSTRUCTIONS
TR        OTVEHAJTE HETYR;,> SLOVAMI.
------------------------
```

INPUT DOES NOT TAKE -REM-, ANY NUMBER OF ITEMS

```
T5W     BORIS UMNYJ?+
        DA, ON OHEN; UMNYJ MAL;HIK.+
        KTO EGO L<BIT?+
        EGO VSE DETI OHEN; L<B>T.

TRY     2
GAA     1
TE      TYPE FIVE WORD ANSWERS.
AR      BORIS UMNYJ?
        BORIS UMNYJ?
LR      (DA, ON OHEN; UMNYJ MAL;HIK.)
AR      KTO EGO L<BIT?
        KTO EGO L<BIT?
LR      (EGO VSE DETI OHEN; L<B>T.)
RET     2
-------------------------
T5R     SAME AS -T5W- EXCEPT USES RUSSIAN INSTRUCTIONS
-------------------------
```

```
INPUT ALLOWS ANY NO. OF ITEMS, TEST BLOCKS ALWAYS INCLUDED
        WITHOUT USE OF -REM-

TBK     RULE N.G.M2+    <PARENTHESES NOT ALLOWED IN THIS LINE
        DOM()GEN.(A)+
        STOL()G.(A)+
        STUDENT()G.(A)

TRY     1
GAA     1
TE      COMPLETE.
TST     1
LR      DOM/GEN.[DOM(A)
BLK     .
RET     1
TE      REVIEW RULE N.G.M2
FIN     .
TST     1
LR      STOL/G.[STOL(A)
BLK     .
RET     1
TE      REVIEW RULE N.G.M2
FIN     .
TST     1
LR      STUDENT/G.[STUDENT(A)
BLK     .
RET     1
TE      REVIEW RULE N.G.M2
FIN     .
RET     2
-------------------------
TKZ     SAME AS -TBK- EXCEPT INSTRUCTION -COMPLETE- IS OMITTED
-------------------------
```

```
INPUT TAKES ANY NO. OF ITEMS , TEST BLOCKS ALWAYS INCLUDED
        WITHOUT USE OF -REM-

TBD     THE RULE.+      <PARENTHESES NOT ALLOWED IN THIS LINE.
        DAM(A) G.S.(Y)+
        D.S.(E)+
        D.S.(U)
TRY     1
GAA     1
TE      COMPLETE.
TST     1
LR      DAMA/ G.S.[DAM(Y)
BLK     .
RET     1
TE      REVIEW THE RULE.
FIN     .
TST     1
LE            D.S.[DAM(E)
BLK     .
RET     1
TE      REVIEW THE RULE.
FIN     .
TST     1
LE            D.S.[DAM(U)
BLK     .
RET     1
TE      REVIEW THE RULE.
FIN     .
RET     2
--------------------------
TDZ     SAME AS -TBD- EXCEPT INSTRUCTION -COMPLETE- IS OMITTED
```

```
INPUT DOES NOT TAKE -REM-, ANY NO. OF ITEMS

VOC     BROTHER+
        BRAT+
        SISTER+
        SESTRA

TRY     1
GAA     1
TE      WE WILL NOW HAVE A VOCABULARY REVIEW.
RET     1
TE      BROTHER
NLR     (BRAT)
RET     1
TE      SISTER
NLR     (SESTRA)
RET     2
------------------------
```

```
W          THE GEN. PL.+
           GLUP(A>)(YX) DA(MA)(M)+
           ]T(I)(IX) KRASIVY(E)(X) DET(I)(EJ)

WAT        30
TRY        1
GAA        1
TE         TYPE THE GEN. PL.
AFR        GLUPA> DAMA
           GLUPA> DAMA
LR         (GLUPYX DAM)
AFR        ]TI KRASIVYE DETI
           ]TI KRASIVYE DETI
LR         (]TIX KRASIVYX DETEJ)
RET        2
------------------------
WR         SAME AS -W- EXCEPT USES RUSSIAN INSTRUCTIONS
WR         FORMU MNOQESTVENNOGO HISLA+
           DAM(A)(Y)+
           MOLOD(A)(YE) BAB(A)(Y)

TRY        1
GAA        1
TR         NAPEHATAJTE FORMU MNOQESTVENNOGO HISLA
AFR        DAMA
           DAMA
LR         (DAMY)
AFR        MOLODA BABA
           MOLODA BABA
LR         (MOLODYE BABY)
RET        2
-----------------------
```

```
INPUT DOES NOT TAKE -REM-, ANY NO. OF ITEMS

WW       THE SINGULAR.+
         SAMOL←(TY)(T)+
         NEPRI>TN(YE)(A>) DEVOHK(I)(A)

TRY      1
GAA      1
TE       TYPE THE SINGULAR.
RET      1
TR       SAMOL←TY
NLR      (SAMOL←T)
RET      1
TR       NEPRI>INYE DEVOHKI
NLR      (NEPRI>TNA> DEVOHKA     )
RET      2
-------------------------
INPUT DOES NOT TAKE -REM-, ANY NO. OT ITEMS

WWR      FORMU MOQESTVENNOGO HISLA+
         ULIC(E)(AM)+
         WIROK(OJ)(IM) DOROG(E)(AM)

TRY      1
GAA      1
TR       NAPEHATAJTE FORMU MOQESTVENNOGO HISLA
RET      1
TR       ULICE
LR       (ULICAM)
RET      1
TR       WIROKOJ DOROGE
LR       (WIROKIM DOROGAM)
RET      2
```

```
INPUT DOES NOT TAKE -REM-, ANY NO. OF ITEMS

Y          THE PLURAL.+
           MAM(A) (Y)+
           DAM(A) (Y)

TRY        1
GAA        1
TE         SAY THE PLURAL.
RET        1
TR         DAMA
WAT        10
AR         DAMY
RET        1
TR         MAMA
WAT        10
AR         DAMY
RET        2

---------------------------
YR         SAME AS Y EXCEPT USES RUSSIAN INSTRUCTIONS
IR         SKAGITE...

-----------------------------
```

```
INPUT DOES NOT TAKE -REM-, ANY NO. OF ITEMS

YY              THE PLURAL*
                UZK(A*)(IE)*
                DLINN(YJ)(YE), WIROK(IJ)(IE) ZDANI(E)(*)

TRY             1
CAA             1
TE              SAY THE PLURAL
AR              UZKA*
                UZKA*
AR              UZKIE
AR              DLINNYJ, WIROKIJ ZDANIE
                DLINNYJ, WIROKIJ ZDANIE
AR              DLINNYE, WIROKIE ZDANI*
RET             2
--------------------------
INPUT DOES NOT TAKE -REM-, ANY NO. OF ITEMS
                SAME AS -YY- EXCEPT USES RUSSIAN INSTRUCTIONS

YYR             FORMU MNOOESTVENNOGO HISLA*
                STU(L)(L$*)*
                OKOLO UDOBN(OGO)(YX) KRES(LA)(EL)

TRY             1
CAA             1
TR              SKAOITE FORMU MNOOESTVENNOGO HISLA
AR              STUL
                STUL
AR              STUL$*
AR              OKOLO UDOBNOGO KRESLA
                OKOLO UDOBNOGO KRESLA
AR              OKOLO UDOBNYX KRESEL
RET             2
----------------------------------
```

Appendix 2

BORIS

1. General Description of the Basic Operating Russian Instructional System (BORIS)

BORIS is a computer-assisted instructional system which runs on the Zeus time-sharing system on a PDP-1 computer at the Institute for Mathematical Studies in the Social Sciences at Stanford University.

2. The Background System

Zeus is the name of the IMSSS time-sharing system. It operates on a Digital Equipment Corporation PDP-1. Associated with the main processor are an IBM 1301 disk unit, 12 Philco BRAD units with keyboard and display scope, and several Model-33 and Model-35 teletypewriters. The system includes as standard user programs a text-editor by which text-files may be generated onto the disk from the keyboard and a lister program by which hard copies of text files may be printed on a teletype.

BORIS runs as a user program under this time-sharing system and itself time-shares the students as individual micro-users under the run-time program. Figure 1 shows various programs and disk-files used in the BORIS system with their interconnections.

3. Input Preparation

The text of each day's lesson goes through four files and three pre-processors before it is available to the run-time program. Briefly, the procedure is as follows:

1. Using the text-editor, a manuscript is entered into the computer. This text-file (INPUT) consists of highly coded material using a set of predefined op-codes and combinations of English and Russian (transliterated) text. (For examples of the input coding, see Appendix 1.)
2. The INPUT is processed by Processor-I, which acts generally as a macro-expander, to produce a second text-file (SCRIPT). The SCRIPT, like the INPUT, consists of op-codes and text. The codes, however, have been reduced to a limited set of basic operations and the text now mirrors both the actual text which will be presented to the student on the teletype and those answers which will be expected of him. The audio portion of the SCRIPT is then listed on a teletype to prepare an audio script used for preparing the audio portion of the lesson.
3. The SCRIPT is processed by Processor-II to produce the run-code used by the run-time program. This code is generated onto a scratch (temporary) file while, at the same time, the SCRIPT is checked for format correctness.
4. If the SCRIPT contains no errors, the run-code is transferred from the scratch file onto a permanent run-code file by Processor III.

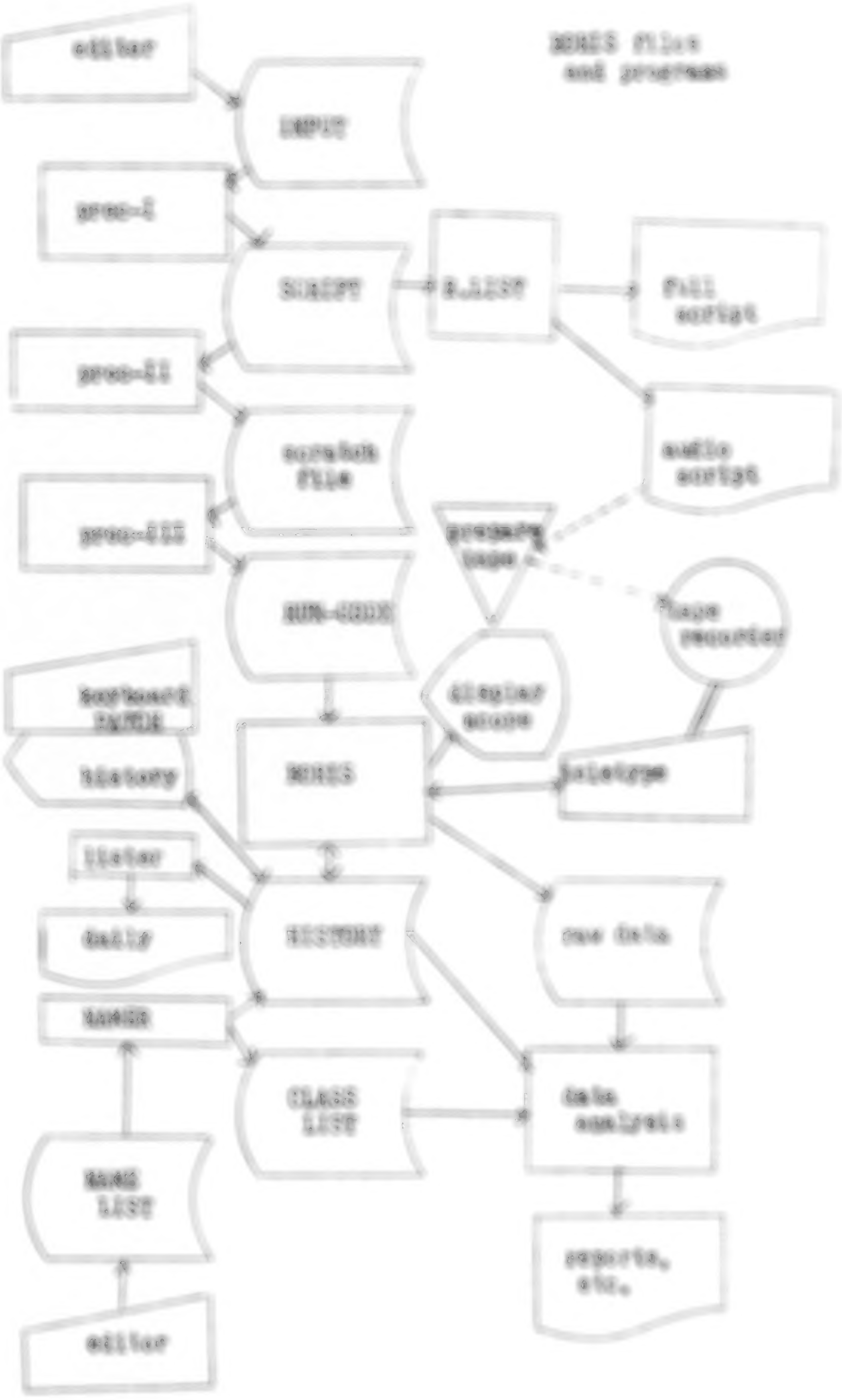
BORIS files
and programs
editor
INPUT
proc-I
SCRIPT
S.LIST
full script
proc-II
audio script
scratch file
proc-III
prepare tape
RUN-CODE
tape recorder
keyboard PATCH
display scope
history
BORIS
teletype
lister
HISTORY
raw data
daily
RANKER
CLASS LIST
data analysis
NAME LIST
reports, etc.
editor

Figure 1

Copies of the INPUT, the SCRIPT, and the RUN-CODE for each lesson are read onto DEC micro-tapes for back-up purposes and the process of preparing input can be initiated at any desired point in the above chain by starting with the appropriate text.

4. Audio Preparation

Using the listed audio script prepared from the SCRIPT, a master tape of the audio portion of the lesson is recorded on channel-A of a two-track tape. This is done off-line. The master tape is mounted on one of the Ampex units with record facilities and the tape is "beeped," using a program which, under the intervention of an operator listening to a playback of channel-A and following the marked script, records a beep (four teletype characters) directly onto channel-B at the appropriate places on the tape. The first three characters of a beep are simply a sequential count and the last character is a special stop code which, as will be explained, signals the end of a message. Each discrete message of the audio portion of the lesson is thus marked with a beep. Once the master tape has been beeped, several copies of the tape are made to be used on the audio equipment at each student station.

During the course of the lesson, messages are played sequentially as they appear on the tape and are not repeated.

5. Control of the Audio

The audio units are controlled through the teletypes. Each teletype has associated with it one audio station. Five special teletype characters are used to control the audio (i.e., characters sent to the teletype act as control functions for the audio units). The five characters are:

play - turn on the recorder for playback;

silent - cause the message to not be heard over the earphones;

stop - stop the recorder;

fast forward - advance the tape quickly;

rewind - fast reverse, rewind the tape.

Zeus, the time-sharing system, has been programmed so that the stop code may be automatically duplexed; when recognized as an input character, it will generate a like output character. This feature allows the tape to be stopped as soon as the stop code recorded with each beep is recognized by Zeus and frees the run-time user program from the responsibility of sending a signal to stop the tape.

6. The Text

The text for the Russian is a combination of English and Russian. To indicate Russian text, a transliteration of the Cyrillic alphabet is used as shown in Table 1. To simplify the material, a one-to-one character transliteration is used, employing the 26 letters of the Latin alphabet and 7 additional non-alphabetic characters (< > ; :] = ←). These are all lower-case characters on the Philco keyboard and are included in the standard set of teletype characters, thus allowing accurate listings of the text-files.

TABLE 1

RUSSIAN CHARACTERS AND TRANSLITERATION

А	Б	В	Г	Д	Е	Е	Ж	З	И	Й
A	B	V	G	D	E	←	Q	Z	I	J
К	Л	М	Н	О	П	Р	С	Т	У	Ф
K	L	M	N	O	P	R	S	T	U	F
Х	Ц	Ч	Ш	Щ	Ъ	Ы	Ь	Э	Ю	Я
X	C	H	W	=	:	Y	;	]	<	>

ENGLISH CHARACTERS

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

NUMERALS

0 1 2 3 4 5 6 7 8 9

OTHER CHARACTERS

' . , ? - ! _

To indicate whether a character in the text represents a Latin or a Cyrillic letter, two additional characters, / and [are used. A special version of the standard lister program available under Zeus is used that prints both of the above characters as space, but recognizes / as a signal to switch from Cyrillic (Russian) to Latin (English) and [as a signal to switch from Latin to Cyrillic. Thus, a line of text might read

[-kniga-/means -book-, but[-knigi-/means -books-.

These methods are also used by Processor-II when generating run-code from the SCRIPT text-file.

7. Input

The original input into the computer is in the form of a highly coded manuscript. (See Appendix 1.)

The INPUT is listed with the standard system lister program to obtain hard copy for proofreading and reflects exactly what is contained on the text-file.

8. Script

The script consists of the following set of 33 basic op-codes:

audio

AE audio English

The text following, which begins in English, is to be recorded on the audio tape, and a signal to play an audio message is to be generated at this point.

AR audio Russian

AFE audio future English

Same as AE, but the signal to play the tape is delayed until the teletype has positioned itself awaiting the student's response.

AFR audio future Russian

teletype output

TE type English

The following text, which begins in English, is to be typed on the teletype.

TR type Russian

RET returns

The number following this op-code specifies the number of line-feeds desired for spacing and grouping of material on the teletype at run-time.

teletype input

123 This actually represents 16 separate op-codes. The text following the op-code contains one or more sets of parentheses. The material outside the parentheses will be typed by the computer, that inside the parentheses is the required answer, e.g.,

book is [(kniga)

fill in --[on duma(l), ona duma(la).

1 is either null or N. If null, two line-feeds will be generated in the run-code preceding the text in order to space it on the paper; if N, these line-feeds will be suppressed.

2 is one of "S, Q, C, L." These represent the four basic ways in which a response may be elicited from the student. S (simple) means that the line will be typed with an underscore to position the response and the teletype will then return and position itself at the underscores, awaiting the student response. This is used for responses to fill in blanks. Q (quick) means that the teletype will type up to the desired response and wait for the student to supply the answer. Then it will continue the line to the next response desired. This is used for responses to complete word endings. Both S- and Q-type answers require the student to start over and type the entire desired response when given additional opportunities after an error. C (character) and L (linear) are equivalent to S and Q, but signal the run-time program to supply those initial characters of the answer which are correctly typed in. Thus a student, rather than having to start over later, merely needs to try again at the point at which the error occurred.

3 is either E or R and merely indicates whether the text begins in English or in Russian.

timing and repetition control

WAT wait n

N specifies a length of time for the program to wait while the student repeats an audio message or says a sentence in Russian.

RST restart

This marks a restart point to which the lesson will return should system failure cause a student's lesson to terminate abruptly prior to completion.

TRY set try to n

Set a parameter, originally 3, which tells how many times a student must repeat subsequent responses before the program gives up and proceeds to the following lesson material.

GAA give answer after n

Set a parameter, originally 2, which tells how many times subsequent answers must be typed incorrectly before the program will give the answer.

TIM set time to n

Set a parameter, originally 10 seconds, which tells how long to wait on subsequent answers before declaring "time is up."

program flow

BEG begin

Marks the beginning of a lesson.

END end

Marks the end of a lesson.

TST test

Marks the beginning of a test section.

BLK remedial block

Marks the termination of the preceding test and the start of material which will be ignored if the student responded correctly to the material in that test.

FIN end of remedial block.

9. Run Code

The run code, unlike INPUT and SCRIPT, is not a text-file, although it consists of a combination of op-codes and text. In the run-code, there are now only 20 basic operations and the text material is stored two teletype characters per 18-bit machine word. The basic operations at run-time are:

audio	Signal to play an audio message
first-time audio	Like audio, but since it has been generated by AFE or AFR, it occurs in the middle of text and must be ignored if the student repeats a response attempt.
type	Type some text to the student.
problem statement	Type some text to the student, but note position in case problem must be repeated.
new problem	Increment problem counter.
full response	The following text is to be compared with the characters typed in by the student above the underscores. The comparison is performed character by character as the response is typed. This operation corresponds to S (simple) type response specification, and the student is required to repeat the full response should he make an error.

correctable full response	Corresponds to Q (quick) response specification. As the answer is not limited by the space indicated with the underscores, the student is allowed to type extra characters which indicate that previous characters were in error and are to be ignored. Thus, the student is allowed to correct mistakes before his response is evaluated. Naturally, for such answers, the student is required to type a special character to indicate that he is satisfied with what he has typed and is, therefore, finished with his response. Again, he is required to retype the entire answer should his first try be incorrect.
character response	Corresponds to C (character) response specification. If he makes a mistake when filling in underscores, the program will supply any initial characters which were typed correctly.
correctable character response	Corresponds to L (linear) response specification.
wait	Performs WAT.
restart	Performs RST.
set tries	Performs TRY.
give answer after	Performs GAA.
set time	Performs TIM.
finish	Terminates the lesson, gives summary information, and writes performance information on student history file.
test block	Clears an indicator which will be set should a response be typed incorrectly or timed out.
remedial block	Checks the above indicator and either continues into the remedial block or scans texts until the matching fin-block.
fin-block	Marks the end of a remedial block.
end of record	Notes the end of a record on the disk and causes additional lesson material to be read in the program buffers.
reset	Reset text-pointers to the start of the text-buffers. This is the only op-code that is not generated by Processor-II, but by the run-time program itself.

10. Processor-I

Processor-I is basically a macro expander. It reads the INPUT and converts each op-code to a series of basic SCRIPT operations, supplying standard instructions that correspond to the action desired.

11. Processor-II

The second processor is used first to convert the SCRIPT into run-code, and second to detect syntax errors in the material. Thus, for example, the unbalanced parentheses of

```
LE   complete -[on duma(1),/but[ona dumala).
```

would be detected. Processor-II can be run to generate run-code and syntax check or simply to syntax check.

12. Processor-III

Processor-III stores run-code previously generated onto a scratch file at the next available area of the permanent run-code file. It also is used to garbage collect the run-code file of unneeded lesson material and to determine what lessons are currently available to the run-time program.

13. Student Histories

In much the same manner as the text of the lessons, information about the students is initially typed onto a text-file via the standard editor program and then converted to a history file accessible to the run-time program. Files and programs pertaining to this aspect of the system are:

Name List. This is a text-file containing the names (in English and in Russian) of each student in the course, as well as several additional persons, such as the writer, who also take the lessons. It also indicates the number by which each student identifies himself to the program when he signs on.

Namer. The NAME LIST is read by a NAMER program which prepares two binary files. One is the CLASS LIST used in data analysis and the second is the HISTORY file, which will contain such items as the student number and name, his current lesson, his score and the duration of his previous lesson, as well as miscellaneous information used by the system.

R.STAT. A daily report of each student's performance is prepared for immediate evaluation and to indicate which tape is to be mounted on the audio unit when that student reports for his next machine session. If a student does poorly on a lesson (under 70 per cent), he is automatically scheduled to repeat that lesson.

Patch. At any time, the current status of the student's HISTORY can be displayed on the READ scope and changed if necessary.

14. The Run-time Program

The run-time program accesses 3 disk-files (the run-code, student histories, raw data file), maintains a display on a READ scope, and uses 7 Model-35 teletypes as I/O devices.

There are two distinct sections of the run-time program. The first is the program that processes a student's lesson. This could be considered as a separate program running by itself, but is actually a micro-time shared user. This user reads the student's sign-on as he types his designated sign-on number. It looks up his history file, determines what lesson to run, and then runs that lesson using the run-code stored on the run-code file. As it proceeds, it continually writes out raw data on a data file to be used later for analysis of performance. Finally, when the student reaches the end of the day's lesson, it updates his history, gives him a brief summary of his performance for the current lesson, and signs him off. This entire procedure is performed using re-entrant code with pointers to individual variables and calling special subroutines to perform input and output interface to the teletype.

The second part of the run-time program is a self-contained time-sharing system. It includes the features that read characters from the teletypes, sets the appropriate pointers for the user who is operating on the teletype just seen, and then allows that user to run until he either requests additional input or requests output of text to the teletype.

Thus, the micro-users run as input-activated programs in a time-sharing system. With the number of users at any given time limited to seven by the availability of teletype-audio student stations, it is possible to run using one 4K block of memory for the machine code and a second 4K block for text-buffers. The Zeus time-sharing system allows each user a maximum of 12K, so there is no problem with machine memory limitations, although a similar program currently being used at IMSSS, by swapping 4K core-loads of memory onto a high-speed drum storage unit, is able to run over 75 students at a time taking mathematics drills on Model-33 teletypes.

Appendix 3

Student Enrollment Statistics

Attrition in first-year Russian courses is high in most universities as it is at Stanford. This is probably caused by the greater difficulty of the Russian language as compared with the major Western European languages.

Table 1 shows the number of students who left the computer-based and conventional first-year Russian sections and indicates "new" students in either section (i.e., students who entered the section at the beginning of the winter or spring quarter after previous training at another institution or in an earlier year at Stanford). There was only one transfer from the computer-based section to the regular group.

Those students who chose to leave the computer-based course permanently came to explain their reasons for doing so. The following is a summary of the information at our disposal.

Student 1

The first student to drop out had many personal problems and was away from the Stanford campus for a large part of the fall quarter. He neglected all of his classes and received a grade of D- on the fall midterm examination. After tentatively withdrawing from college, he decided to attempt to salvage his other courses by dropping Russian before the fall final examination. He was the only student who was not performing satisfactorily when he left.

Student 2

This student was in the teaching internship program at Stanford, teaching part time and studying part time. He was often late for class, because of the distance between his teaching job and Stanford and seemed under constant pressure. In spite of this, he finished the first quarter with a grade of C+. He dropped out after the first quarter.

Student 3

The third student received an A- for the first quarter final examination. A graduate student in political science, he had returned to school in the fall of 1967 after an absence of eight years. After the end of the first quarter, he decided to leave Stanford altogether.

Student 4

The fourth student received a B on the fall final examination. He abandoned Russian because he was forced to carry a large number of other courses to complete the requirements for his major.

Student 5

The fifth student was enthusiastic about computer-based instruction during the entire first quarter. In the second quarter, he expressed dissatisfaction, stating that the instructional system was a dictatorial mode of communication from the computer to him that permitted no dialogue between them. He finished the first quarter with an A and the second quarter with an A-, but did not go into the third quarter.

Student 6

This student finished the first quarter with a B and the second quarter with a C+. He then decided to leave the computer-based class to join the conventionally taught class for the third quarter. He made an F on the spring final examination, making 166 errors, more than any other student in both groups.

Student 7

An A- student in both the first and second quarters, this girl decided not to take the third quarter, since she intended to attend Stanford in Germany during the following year and felt she should concentrate on German.

Student 8

A B+ student in the first quarter, he was in great demand as a speaker on the situation in Vietnam, since his father was a prominent political leader in that country. His extracurricular commitments, combined with tensions resulting from the arrest of his family by the Saigon government, caused him to withdraw during the second quarter.

TABLE 1

Student Losses

	Computer-based	Regular
First Quarter	Beginning = 30 students End = 29 students	Beginning = 38 students End = 28 students
Second Quarter	Beginning = 28 students (26 who had taken the first quarter plus 2 new students) End = 27 students	Beginning = 15 students (All from the original group) End = 15 students
Third Quarter	Beginning = 24 students End = 24 students (22 who had taken all 3 quarters of the academic year, plus 2 students who joined the class at the beginning of the second quarter)	Beginning = 16 students End = 16 students (12 who had taken all 3 quarters of the academic year, plus 1 transfer from the computer-based class, plus three new students who joined at the beginning of the third quarter)

Appendix 4

First Quarter Lesson Summary Analysis

```
     LESSONS   1 TO  46

ALL ITEM TYPES                          5488 ITEMS
            AVERAGE PER CENT CORRECT   78.4
            CORRECT LATENCY IN SECS.    1.5 AVG.    1.23 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN          307 ITEMS
            AVERAGE PER CENT CORRECT   68.5
            CORRECT LATENCY IN SECS.    0.9 AVG.    0.32 S.D.

TRANSLATE FROM TELETYPE ENGLISH         1179 ITEMS
            AVERAGE PER CENT CORRECT   71.5
            CORRECT LATENCY IN SECS.    1.0 AVG.    0.30 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN          534 ITEMS
            AVERAGE PER CENT CORRECT   74.9
            CORRECT LATENCY IN SECS.    0.8 AVG.    0.62 S.D.

TRANSFORM FROM TELETYPE RUSSIAN         369 ITEMS
            AVERAGE PER CENT CORRECT   80.0
            CORRECT LATENCY IN SECS.    1.2 AVG.    0.61 S.D.

TRANSFORM FROM SPOKEN RUSSIAN           132 ITEMS
            AVERAGE PER CENT CORRECT   69.9
            CORRECT LATENCY IN SECS.    0.8 AVG.    0.30 S.D.

INFLECT TELETYPE RUSSIAN                2713 ITEMS
            AVERAGE PER CENT CORRECT   84.9
            CORRECT LATENCY IN SECS.    2.1 AVG.    1.09 S.D.

OTHER ITEM TYPES                        254 ITEMS
            AVERAGE PER CENT CORRECT   62.9
            CORRECT LATENCY IN SECS.    1.7 AVG.    3.41 S.D.
```

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          LESSON   7   DATA FOR  28  STUDENTS

ALL ITEM TYPES                              152 ITEMS
              AVERAGE PER CENT CORRECT     81.5
              CORRECT LATENCY IN SECS.      1.6 AVG.     0.89 S.D.


TYPE ANSWERS TO SPOKEN RUSSIAN                9 ITEMS
              AVERAGE PER CENT CORRECT     77.0
              CORRECT LATENCY IN SECS.      0.8 AVG.     0.35 S.D.


TRANSLATE FROM TELETYPE ENGLISH              36 ITEMS
              AVERAGE PER CENT CORRECT     69.8
              CORRECT LATENCY IN SECS.      1.1 AVG.     0.33 S.D.


TRANSCRIBE FROM SPOKEN RUSSIAN               18 ITEMS
              AVERAGE PER CENT CORRECT     80.4
              CORRECT LATENCY IN SECS.      1.1 AVG.     1.03 S.D.


TRANSFORM FROM TELETYPE RUSSIAN              20 ITEMS
              AVERAGE PER CENT CORRECT     78.4
              CORRECT LATENCY IN SECS.      1.1 AVG.     0.27 S.D.


TRANSFORM FROM SPOKEN RUSSIAN                 0 ITEMS




INFLECT TELETYPE RUSSIAN                     62 ITEMS
              AVERAGE PER CENT CORRECT     90.0
              CORRECT LATENCY IN SECS.      2.2 AVG.     0.87 S.D.


OTHER ITEM TYPES                              7 ITEMS
              AVERAGE PER CENT CORRECT     84.7
              CORRECT LATENCY IN SECS.      1.5 AVG.     0.68 S.D.
          LESSON   8    DATA FOR  30  STUDENTS

ALL ITEM TYPES                           152 ITEMS
          AVERAGE PER CENT CORRECT      76.5
          CORRECT LATENCY IN SECS.       1.7 AVG.     1.11 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN            13 ITEMS
          AVERAGE PER CENT CORRECT      63.3
          CORRECT LATENCY IN SECS.       1.0 AVG.     0.43 S.D.

TRANSLATE FROM TELETYPE ENGLISH           42 ITEMS
          AVERAGE PER CENT CORRECT      68.6
          CORRECT LATENCY IN SECS.       1.1 AVG.     0.32 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN            21 ITEMS
          AVERAGE PER CENT CORRECT      72.9
          CORRECT LATENCY IN SECS.       1.7 AVG.     1.81 S.D.

TRANSFORM FROM TELETYPE RUSSIAN           14 ITEMS
          AVERAGE PER CENT CORRECT      72.6
          CORRECT LATENCY IN SECS.       1.3 AVG.     0.56 S.D.

TRANSFORM FROM SPOKEN RUSSIAN              0 ITEMS



INFLECT TELETYPE RUSSIAN                  57 ITEMS
          AVERAGE PER CENT CORRECT      85.9
          CORRECT LATENCY IN SECS.       2.4 AVG.     1.02 S.D.

OTHER ITEM TYPES                           5 ITEMS
          AVERAGE PER CENT CORRECT      95.3
          CORRECT LATENCY IN SECS.       2.5 AVG.     0.73 S.D.
```

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                  LESSON   9    DATA FOR  29  STUDENTS

ALL ITEM TYPES                                  139 ITEMS
                  AVERAGE PER CENT CORRECT     76.3
                  CORRECT LATENCY IN SECS.      1.8 AVG.      1.32 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                   10 ITEMS
                  AVERAGE PER CENT CORRECT     47.9
                  CORRECT LATENCY IN SECS.      0.8 AVG.      0.38 S.D.

TRANSLATE FROM TELETYPE ENGLISH                  35 ITEMS
                  AVERAGE PER CENT CORRECT     73.2
                  CORRECT LATENCY IN SECS.      1.1 AVG.      0.24 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                   16 ITEMS
                  AVERAGE PER CENT CORRECT     78.7
                  CORRECT LATENCY IN SECS.      1.7 AVG.      1.31 S.D.

TRANSFORM FROM TELETYPE RUSSIAN                  25 ITEMS
                  AVERAGE PER CENT CORRECT     77.9
                  CORRECT LATENCY IN SECS.      1.4 AVG.      1.04 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                     0 ITEMS



INFLECT TELETYPE RUSSIAN                         47 ITEMS
                  AVERAGE PER CENT CORRECT     80.4
                  CORRECT LATENCY IN SECS.      2.6 AVG.      1.43 S.D.

OTHER ITEM TYPES                                  6 ITEMS
                  AVERAGE PER CENT CORRECT     95.4
                  CORRECT LATENCY IN SECS.      3.0 AVG.      2.01 S.D.
```

```
          LESSON  10    DATA FOR  19  STUDENTS

ALL ITEM TYPES                          254 ITEMS
          AVERAGE PER CENT CORRECT     81.4
          CORRECT LATENCY IN SECS.      1.4 AVG.     0.98 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN            0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH          91 ITEMS
          AVERAGE PER CENT CORRECT     74.9
          CORRECT LATENCY IN SECS.      1.0 AVG.     0.55 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN            6 ITEMS
          AVERAGE PER CENT CORRECT     42.1
          CORRECT LATENCY IN SECS.      0.7 AVG.     0.38 S.D.

TRANSFORM FROM TELETYPE RUSSIAN          55 ITEMS
          AVERAGE PER CENT CORRECT     85.3
          CORRECT LATENCY IN SECS.      1.1 AVG.     0.61 S.D.

TRANSFORM FROM SPOKEN RUSSIAN             0 ITEMS



INFLECT TELETYPE RUSSIAN                102 ITEMS
          AVERAGE PER CENT CORRECT     87.4
          CORRECT LATENCY IN SECS.      1.9 AVG.     1.22 S.D.

OTHER ITEM TYPES                          0 ITEMS
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                LESSON  12    DATA FOR  25  STUDENTS

ALL ITEM TYPES                           166 ITEMS
                AVERAGE PER CENT CORRECT    75.3
                CORRECT LATENCY IN SECS.     1.7 AVG.    1.00 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN            19 ITEMS
                AVERAGE PER CENT CORRECT    57.1
                CORRECT LATENCY IN SECS.     1.2 AVG.    0.45 S.D.

TRANSLATE FROM TELETYPE ENGLISH           24 ITEMS
                AVERAGE PER CENT CORRECT    71.3
                CORRECT LATENCY IN SECS.     1.0 AVG.    0.20 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN            28 ITEMS
                AVERAGE PER CENT CORRECT    70.9
                CORRECT LATENCY IN SECS.     1.1 AVG.    0.92 S.D.

TRANSFORM FROM TELETYPE RUSSIAN           13 ITEMS
                AVERAGE PER CENT CORRECT    78.8
                CORRECT LATENCY IN SECS.     1.2 AVG.    0.23 S.D.

TRANSFORM FROM SPOKEN RUSSIAN              0 ITEMS



INFLECT TELETYPE RUSSIAN                  74 ITEMS
                AVERAGE PER CENT CORRECT    80.5
                CORRECT LATENCY IN SECS.     2.4 AVG.    0.97 S.D.

OTHER ITEM TYPES                           8 ITEMS
                AVERAGE PER CENT CORRECT    93.0
                CORRECT LATENCY IN SECS.     1.9 AVG.    0.70 S.D.
```

```
                    LESSON  13    DATA FOR  15  STUDENTS

ALL ITEM TYPES                                   163 ITEMS
                AVERAGE PER CENT CORRECT        63.9
                CORRECT LATENCY IN SECS.         1.6 AVG.     1.04 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                    33 ITEMS
                AVERAGE PER CENT CORRECT        48.3
                CORRECT LATENCY IN SECS.         1.1 AVG.     0.32 S.D.

TRANSLATE FROM TELETYPE ENGLISH                   43 ITEMS
                AVERAGE PER CENT CORRECT        61.2
                CORRECT LATENCY IN SECS.         1.0 AVG.     0.29 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                    15 ITEMS
                AVERAGE PER CENT CORRECT        67.6
                CORRECT LATENCY IN SECS.         0.8 AVG.     0.31 S.D.

TRANSFORM FROM TELETYPE RUSSIAN                   18 ITEMS
                AVERAGE PER CENT CORRECT        76.3
                CORRECT LATENCY IN SECS.         1.3 AVG.     0.49 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                      0 ITEMS



INFLECT TELETYPE RUSSIAN                          45 ITEMS
                AVERAGE PER CENT CORRECT        66.7
                CORRECT LATENCY IN SECS.         2.7 AVG.     1.15 S.D.

OTHER ITEM TYPES                                   9 ITEMS
                AVERAGE PER CENT CORRECT        89.6
                CORRECT LATENCY IN SECS.         2.4 AVG.     1.30 S.D.
```

```
          LESSON  14    DATA FOR  25  STUDENTS

ALL ITEM TYPES                             158 ITEMS
          AVERAGE PER CENT CORRECT     74.3
          CORRECT LATENCY IN SECS.      1.6 AVG.     0.94 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN              12 ITEMS
          AVERAGE PER CENT CORRECT     69.3
          CORRECT LATENCY IN SECS.      1.0 AVG.     0.31 S.D.

TRANSLATE FROM TELETYPE ENGLISH             42 ITEMS
          AVERAGE PER CENT CORRECT     65.3
          CORRECT LATENCY IN SECS.      1.1 AVG.     0.20 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN               8 ITEMS
          AVERAGE PER CENT CORRECT     81.5
          CORRECT LATENCY IN SECS.      0.7 AVG.     0.16 S.D.

TRANSFORM FROM TELETYPE RUSSIAN             16 ITEMS
          AVERAGE PER CENT CORRECT     85.0
          CORRECT LATENCY IN SECS.      1.2 AVG.     0.36 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                5 ITEMS
          AVERAGE PER CENT CORRECT     65.6
          CORRECT LATENCY IN SECS.      1.1 AVG.     0.08 S.D.

INFLECT TELETYPE RUSSIAN                    70 ITEMS
          AVERAGE PER CENT CORRECT     76.3
          CORRECT LATENCY IN SECS.      2.4 AVG.     1.00 S.D.

OTHER ITEM TYPES                             5 ITEMS
          AVERAGE PER CENT CORRECT     96.0
          CORRECT LATENCY IN SECS.      1.6 AVG.     0.40 S.D.
```

```
           LESSON  15    DATA FOR  29  STUDENTS

ALL ITEM TYPES                              196 ITEMS
           AVERAGE PER CENT CORRECT    76.8
           CORRECT LATENCY IN SECS.      1.8 AVG.     2.28 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                4 ITEMS
           AVERAGE PER CENT CORRECT    40.5
           CORRECT LATENCY IN SECS.      1.4 AVG.     0.43 S.D.

TRANSLATE FROM TELETYPE ENGLISH              45 ITEMS
           AVERAGE PER CENT CORRECT    71.0
           CORRECT LATENCY IN SECS.      1.0 AVG.     0.20 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN               34 ITEMS
           AVERAGE PER CENT CORRECT    68.3
           CORRECT LATENCY IN SECS.      0.7 AVG.     0.23 S.D.

TRANSFORM FROM TELETYPE RUSSIAN              18 ITEMS
           AVERAGE PER CENT CORRECT    89.1
           CORRECT LATENCY IN SECS.      0.9 AVG.     0.25 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                 0 ITEMS



INFLECT TELETYPE RUSSIAN                     84 ITEMS
           AVERAGE PER CENT CORRECT    82.0
           CORRECT LATENCY IN SECS.      2.4 AVG.     1.25 S.D.

OTHER ITEM TYPES                             11 ITEMS
           AVERAGE PER CENT CORRECT    81.1
           CORRECT LATENCY IN SECS.      5.1 AVG.     8.01 S.D.
```

```
          LESSON  16    DATA FOR  30  STUDENTS

ALL ITEM TYPES                              132 ITEMS
          AVERAGE PER CENT CORRECT    75.6
          CORRECT LATENCY IN SECS.     1.3 AVG.    0.91 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN               22 ITEMS
          AVERAGE PER CENT CORRECT    77.0
          CORRECT LATENCY IN SECS.     0.9 AVG.    0.27 S.D.

TRANSLATE FROM TELETYPE ENGLISH              38 ITEMS
          AVERAGE PER CENT CORRECT    68.6
          CORRECT LATENCY IN SECS.     1.0 AVG.    0.36 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN               16 ITEMS
          AVERAGE PER CENT CORRECT    53.2
          CORRECT LATENCY IN SECS.     0.8 AVG.    0.16 S.D.

TRANSFORM FROM TELETYPE RUSSIAN               3 ITEMS
          AVERAGE PER CENT CORRECT    84.4
          CORRECT LATENCY IN SECS.     0.7 AVG.    0.10 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                 0 ITEMS



INFLECT TELETYPE RUSSIAN                     45 ITEMS
          AVERAGE PER CENT CORRECT    84.7
          CORRECT LATENCY IN SECS.     2.1 AVG.    1.12 S.D.

OTHER ITEM TYPES                              8 ITEMS
          AVERAGE PER CENT CORRECT    90.8
          CORRECT LATENCY IN SECS.     1.5 AVG.    0.55 S.D.
```

```
              LESSON  18    DATA FOR  23  STUDENTS

ALL ITEM TYPES                                  151 ITEMS
              AVERAGE PER CENT CORRECT         75.3
              CORRECT LATENCY IN SECS.          1.7 AVG.      1.23 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                   19 ITEMS
              AVERAGE PER CENT CORRECT         48.1
              CORRECT LATENCY IN SECS.          0.9 AVG.      0.30 S.D.

TRANSLATE FROM TELETYPE ENGLISH                  28 ITEMS
              AVERAGE PER CENT CORRECT         60.3
              CORRECT LATENCY IN SECS.          1.2 AVG.      0.28 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                   19 ITEMS
              AVERAGE PER CENT CORRECT         80.0
              CORRECT LATENCY IN SECS.          0.8 AVG.      0.19 S.D.

TRANSFORM FROM TELETYPE RUSSIAN                  17 ITEMS
              AVERAGE PER CENT CORRECT         75.3
              CORRECT LATENCY IN SECS.          1.3 AVG.      0.46 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                     0 ITEMS



INFLECT TELETYPE RUSSIAN                         65 ITEMS
              AVERAGE PER CENT CORRECT         81.3
              CORRECT LATENCY IN SECS.          2.6 AVG.      1.18 S.D.

OTHER ITEM TYPES                                  3 ITEMS
              AVERAGE PER CENT CORRECT        100.0
              CORRECT LATENCY IN SECS.          1.6 AVG.      0.10 S.D.
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          LESSON  19   DATA FOR  25  STUDENTS

ALL ITEM TYPES                             148 ITEMS
          AVERAGE PER CENT CORRECT        64.4
          CORRECT LATENCY IN SECS.         1.6 AVG.     1.36 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN               9 ITEMS
          AVERAGE PER CENT CORRECT        66.7
          CORRECT LATENCY IN SECS.         1.0 AVG.     0.25 S.D.

TRANSLATE FROM TELETYPE ENGLISH             53 ITEMS
          AVERAGE PER CENT CORRECT        60.8
          CORRECT LATENCY IN SECS.         0.9 AVG.     0.17 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN              19 ITEMS
          AVERAGE PER CENT CORRECT        60.4
          CORRECT LATENCY IN SECS.         0.8 AVG.     0.15 S.D.

TRANSFORM FROM TELETYPE RUSSIAN             16 ITEMS
          AVERAGE PER CENT CORRECT        76.3
          CORRECT LATENCY IN SECS.         1.1 AVG.     0.31 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                0 ITEMS



INFLECT TELETYPE RUSSIAN                    45 ITEMS
          AVERAGE PER CENT CORRECT        63.8
          CORRECT LATENCY IN SECS.         3.1 AVG.     1.67 S.D.

OTHER ITEM TYPES                             6 ITEMS
          AVERAGE PER CENT CORRECT        78.0
          CORRECT LATENCY IN SECS.         1.4 AVG.     1.04 S.D.
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            LESSON  20    DATA FOR  27  STUDENTS

ALL ITEM TYPES                            175 ITEMS
            AVERAGE PER CENT CORRECT     77.9
            CORRECT LATENCY IN SECS.      1.6 AVG.     2.14 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN              0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH            40 ITEMS
            AVERAGE PER CENT CORRECT     66.5
            CORRECT LATENCY IN SECS.      1.0 AVG.     0.29 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN             19 ITEMS
            AVERAGE PER CENT CORRECT     74.9
            CORRECT LATENCY IN SECS.      0.7 AVG.     0.14 S.D.

TRANSFORM FROM TELETYPE RUSSIAN            26 ITEMS
            AVERAGE PER CENT CORRECT     79.3
            CORRECT LATENCY IN SECS.      1.2 AVG.     0.97 S.D.

TRANSFORM FROM SPOKEN RUSSIAN               0 ITEMS



INFLECT TELETYPE RUSSIAN                   89 ITEMS
            AVERAGE PER CENT CORRECT     84.2
            CORRECT LATENCY IN SECS.      1.9 AVG.     0.98 S.D.

OTHER ITEM TYPES                            1 ITEMS
            AVERAGE PER CENT CORRECT      2.0
            CORRECT LATENCY IN SECS.     27.0 AVG.     0.00 S.D.
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          LESSON  21    DATA FOR  17  STUDENTS

ALL ITEM TYPES                           186 ITEMS
          AVERAGE PER CENT CORRECT      78.8
          CORRECT LATENCY IN SECS.       1.7 AVG.     1.18 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN            14 ITEMS
          AVERAGE PER CENT CORRECT      72.3
          CORRECT LATENCY IN SECS.       0.8 AVG.     0.21 S.D.

TRANSLATE FROM TELETYPE ENGLISH           50 ITEMS
          AVERAGE PER CENT CORRECT      71.2
          CORRECT LATENCY IN SECS.       1.0 AVG.     0.23 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN            14 ITEMS
          AVERAGE PER CENT CORRECT      80.3
          CORRECT LATENCY IN SECS.       0.7 AVG.     0.10 S.D.

TRANSFORM FROM TELETYPE RUSSIAN            7 ITEMS
          AVERAGE PER CENT CORRECT      82.4
          CORRECT LATENCY IN SECS.       1.0 AVG.     0.26 S.D.

TRANSFORM FROM SPOKEN RUSSIAN              7 ITEMS
          AVERAGE PER CENT CORRECT      88.2
          CORRECT LATENCY IN SECS.       0.7 AVG.     0.17 S.D.

INFLECT TELETYPE RUSSIAN                  87 ITEMS
          AVERAGE PER CENT CORRECT      81.7
          CORRECT LATENCY IN SECS.       2.6 AVG.     1.21 S.D.

OTHER ITEM TYPES                           7 ITEMS
          AVERAGE PER CENT CORRECT      94.1
          CORRECT LATENCY IN SECS.       1.3 AVG.     0.37 S.D.
          LESSON  22    DATA FOR  28  STUDENTS

ALL ITEM TYPES                          162 ITEMS
          AVERAGE PER CENT CORRECT    75.7
          CORRECT LATENCY IN SECS.     1.5 AVG.    1.04 S.D.


TYPE ANSWERS TO SPOKEN RUSSIAN           13 ITEMS
          AVERAGE PER CENT CORRECT    65.7
          CORRECT LATENCY IN SECS.     0.9 AVG.    0.19 S.D.


TRANSLATE FROM TELETYPE ENGLISH          45 ITEMS
          AVERAGE PER CENT CORRECT    72.5
          CORRECT LATENCY IN SECS.     0.9 AVG.    0.29 S.D.


TRANSCRIBE FROM SPOKEN RUSSIAN           19 ITEMS
          AVERAGE PER CENT CORRECT    77.4
          CORRECT LATENCY IN SECS.     0.6 AVG.    0.19 S.D.


TRANSFORM FROM TELETYPE RUSSIAN           8 ITEMS
          AVERAGE PER CENT CORRECT    87.5
          CORRECT LATENCY IN SECS.     1.0 AVG.    0.29 S.D.


TRANSFORM FROM SPOKEN RUSSIAN             0 ITEMS




INFLECT TELETYPE RUSSIAN                 69 ITEMS
          AVERAGE PER CENT CORRECT    75.7
          CORRECT LATENCY IN SECS.     2.3 AVG.    1.06 S.D.


OTHER ITEM TYPES                          8 ITEMS
          AVERAGE PER CENT CORRECT    94.6
          CORRECT LATENCY IN SECS.     1.5 AVG.    0.63 S.D.
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                    LESSON  23    DATA FOR  28  STUDENTS

ALL ITEM TYPES                                 179 ITEMS
                    AVERAGE PER CENT CORRECT   84.5
                    CORRECT LATENCY IN SECS.    1.5 AVG.     0.88 S.D.


TYPE ANSWERS TO SPOKEN RUSSIAN                  11 ITEMS
                    AVERAGE PER CENT CORRECT   78.6
                    CORRECT LATENCY IN SECS.    0.8 AVG.     0.25 S.D.


TRANSLATE FROM TELETYPE ENGLISH                 10 ITEMS
                    AVERAGE PER CENT CORRECT   71.4
                    CORRECT LATENCY IN SECS.    0.9 AVG.     0.16 S.D.


TRANSCRIBE FROM SPOKEN RUSSIAN                  20 ITEMS
                    AVERAGE PER CENT CORRECT   73.4
                    CORRECT LATENCY IN SECS.    0.7 AVG.     0.17 S.D.


TRANSFORM FROM TELETYPE RUSSIAN                  8 ITEMS
                    AVERAGE PER CENT CORRECT   82.6
                    CORRECT LATENCY IN SECS.    0.8 AVG.     0.27 S.D.


TRANSFORM FROM SPOKEN RUSSIAN                    2 ITEMS
                    AVERAGE PER CENT CORRECT   91.1
                    CORRECT LATENCY IN SECS.    0.6 AVG.     0.21 S.D.


INFLECT TELETYPE RUSSIAN                       117 ITEMS
                    AVERAGE PER CENT CORRECT   87.3
                    CORRECT LATENCY IN SECS.    1.9 AVG.     0.87 S.D.


OTHER ITEM TYPES                                11 ITEMS
                    AVERAGE PER CENT CORRECT   93.5
                    CORRECT LATENCY IN SECS.    1.3 AVG.     0.71 S.D.
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                LESSON  24    DATA FOR  16  STUDENTS

ALL ITEM TYPES                          228 ITEMS
            AVERAGE PER CENT CORRECT   80.6
            CORRECT LATENCY IN SECS.    1.5 AVG.    0.84 S.D.


TYPE ANSWERS TO SPOKEN RUSSIAN            7 ITEMS
            AVERAGE PER CENT CORRECT   56.3
            CORRECT LATENCY IN SECS.    0.7 AVG.    0.20 S.D.


TRANSLATE FROM TELETYPE ENGLISH          40 ITEMS
            AVERAGE PER CENT CORRECT   61.7
            CORRECT LATENCY IN SECS.    1.1 AVG.    0.27 S.D.


TRANSCRIBE FROM SPOKEN RUSSIAN           24 ITEMS
            AVERAGE PER CENT CORRECT   81.3
            CORRECT LATENCY IN SECS.    0.7 AVG.    0.20 S.D.


TRANSFORM FROM TELETYPE RUSSIAN          14 ITEMS
            AVERAGE PER CENT CORRECT   85.7
            CORRECT LATENCY IN SECS.    1.1 AVG.    0.41 S.D.


TRANSFORM FROM SPOKEN RUSSIAN            11 ITEMS
            AVERAGE PER CENT CORRECT   83.5
            CORRECT LATENCY IN SECS.    1.1 AVG.    0.39 S.D.


INFLECT TELETYPE RUSSIAN                127 ITEMS
            AVERAGE PER CENT CORRECT   86.7
            CORRECT LATENCY IN SECS.    1.9 AVG.    0.87 S.D.


OTHER ITEM TYPES                          5 ITEMS
            AVERAGE PER CENT CORRECT   86.3
            CORRECT LATENCY IN SECS.    2.3 AVG.    1.31 S.D.
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          LESSON  25    DATA FOR  14  STUDENTS

ALL ITEM TYPES                          209 ITEMS
          AVERAGE PER CENT CORRECT     82.2
          CORRECT LATENCY IN SECS.      1.2 AVG.    0.81 S.D.


TYPE ANSWERS TO SPOKEN RUSSIAN            0 ITEMS




TRANSLATE FROM TELETYPE ENGLISH          26 ITEMS
          AVERAGE PER CENT CORRECT     58.2
          CORRECT LATENCY IN SECS.      0.9 AVG.    0.18 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN           44 ITEMS
          AVERAGE PER CENT CORRECT     73.2
          CORRECT LATENCY IN SECS.      0.7 AVG.    0.18 S.D.

TRANSFORM FROM TELETYPE RUSSIAN          10 ITEMS
          AVERAGE PER CENT CORRECT     82.9
          CORRECT LATENCY IN SECS.      0.9 AVG.    0.25 S.D.

TRANSFORM FROM SPOKEN RUSSIAN            10 ITEMS
          AVERAGE PER CENT CORRECT     78.6
          CORRECT LATENCY IN SECS.      0.8 AVG.    0.25 S.D.

INFLECT TELETYPE RUSSIAN                119 ITEMS
          AVERAGE PER CENT CORRECT     91.1
          CORRECT LATENCY IN SECS.      1.5 AVG.    0.93 S.D.

OTHER ITEM TYPES                          0 ITEMS
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           LESSON  27    DATA FOR  27  STUDENTS

ALL ITEM TYPES                          169 ITEMS
           AVERAGE PER CENT CORRECT    81.4
           CORRECT LATENCY IN SECS.     1.6 AVG.     0.90 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN           10 ITEMS
           AVERAGE PER CENT CORRECT    75.2
           CORRECT LATENCY IN SECS.     1.0 AVG.     0.31 S.D.

TRANSLATE FROM TELETYPE ENGLISH          32 ITEMS
           AVERAGE PER CENT CORRECT    67.0
           CORRECT LATENCY IN SECS.     0.9 AVG.     0.18 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN           14 ITEMS
           AVERAGE PER CENT CORRECT    77.5
           CORRECT LATENCY IN SECS.     0.8 AVG.     0.23 S.D.

TRANSFORM FROM TELETYPE RUSSIAN           3 ITEMS
           AVERAGE PER CENT CORRECT    93.8
           CORRECT LATENCY IN SECS.     1.1 AVG.     0.12 S.D.

TRANSFORM FROM SPOKEN RUSSIAN             3 ITEMS
           AVERAGE PER CENT CORRECT    92.6
           CORRECT LATENCY IN SECS.     0.7 AVG.     0.06 S.D.

INFLECT TELETYPE RUSSIAN                 99 ITEMS
           AVERAGE PER CENT CORRECT    85.4
           CORRECT LATENCY IN SECS.     1.9 AVG.     0.95 S.D.

OTHER ITEM TYPES                          8 ITEMS
           AVERAGE PER CENT CORRECT    94.9
           CORRECT LATENCY IN SECS.     1.9 AVG.     0.73 S.D.
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          LESSON  29    DATA FOR  21  STUDENTS

ALL ITEM TYPES                             171 ITEMS
          AVERAGE PER CENT CORRECT        82.4
          CORRECT LATENCY IN SECS.         1.5 AVG.     0.91 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN              14 ITEMS
          AVERAGE PER CENT CORRECT        63.3
          CORRECT LATENCY IN SECS.         0.9 AVG.     0.17 S.D.

TRANSLATE FROM TELETYPE ENGLISH             16 ITEMS
          AVERAGE PER CENT CORRECT        60.4
          CORRECT LATENCY IN SECS.         0.9 AVG.     0.27 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN              29 ITEMS
          AVERAGE PER CENT CORRECT        83.6
          CORRECT LATENCY IN SECS.         0.6 AVG.     0.18 S.D.

TRANSFORM FROM TELETYPE RUSSIAN              9 ITEMS
          AVERAGE PER CENT CORRECT        96.3
          CORRECT LATENCY IN SECS.         1.0 AVG.     0.48 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                0 ITEMS



INFLECT TELETYPE RUSSIAN                    99 ITEMS
          AVERAGE PER CENT CORRECT        86.4
          CORRECT LATENCY IN SECS.         1.9 AVG.     0.91 S.D.

OTHER ITEM TYPES                             4 ITEMS
          AVERAGE PER CENT CORRECT        98.8
          CORRECT LATENCY IN SECS.         2.2 AVG.     0.54 S.D.
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                  LESSON  30    DATA FOR  30  STUDENTS

ALL ITEM TYPES                                 203 ITEMS
              AVERAGE PER CENT CORRECT       85.5
              CORRECT LATENCY IN SECS.         1.6 AVG.     1.01 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                   8 ITEMS
              AVERAGE PER CENT CORRECT       85.4
              CORRECT LATENCY IN SECS.         0.8 AVG.     0.16 S.D.

TRANSLATE FROM TELETYPE ENGLISH                 34 ITEMS
              AVERAGE PER CENT CORRECT       81.0
              CORRECT LATENCY IN SECS.         0.9 AVG.     0.18 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                  25 ITEMS
              AVERAGE PER CENT CORRECT       81.1
              CORRECT LATENCY IN SECS.         1.0 AVG.     0.90 S.D.

TRANSFORM FROM TELETYPE RUSSIAN                 13 ITEMS
              AVERAGE PER CENT CORRECT       90.0
              CORRECT LATENCY IN SECS.         1.1 AVG.     0.44 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                    5 ITEMS
              AVERAGE PER CENT CORRECT       86.7
              CORRECT LATENCY IN SECS.         0.7 AVG.     0.11 S.D.

INFLECT TELETYPE RUSSIAN                       107 ITEMS
              AVERAGE PER CENT CORRECT       86.2
              CORRECT LATENCY IN SECS.         2.2 AVG.     0.89 S.D.

OTHER ITEM TYPES                                11 ITEMS
              AVERAGE PER CENT CORRECT       97.3
              CORRECT LATENCY IN SECS.         1.9 AVG.     1.76 S.D.
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          LESSON  32    DATA FOR  23  STUDENTS

ALL ITEM TYPES                               144 ITEMS
          AVERAGE PER CENT CORRECT      75.8
          CORRECT LATENCY IN SECS.       1.8 AVG.     1.27 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                12 ITEMS
          AVERAGE PER CENT CORRECT      73.2
          CORRECT LATENCY IN SECS.       0.9 AVG.     0.26 S.D.

TRANSLATE FROM TELETYPE ENGLISH               19 ITEMS
          AVERAGE PER CENT CORRECT      83.3
          CORRECT LATENCY IN SECS.       0.9 AVG.     0.43 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                18 ITEMS
          AVERAGE PER CENT CORRECT      64.7
          CORRECT LATENCY IN SECS.       0.7 AVG.     0.19 S.D.

TRANSFORM FROM TELETYPE RUSSIAN                3 ITEMS
          AVERAGE PER CENT CORRECT      72.5
          CORRECT LATENCY IN SECS.       1.0 AVG.     0.12 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                 13 ITEMS
          AVERAGE PER CENT CORRECT      58.9
          CORRECT LATENCY IN SECS.       1.0 AVG.     0.25 S.D.

INFLECT TELETYPE RUSSIAN                      74 ITEMS
          AVERAGE PER CENT CORRECT      78.9
          CORRECT LATENCY IN SECS.       2.7 AVG.     1.17 S.D.

OTHER ITEM TYPES                               5 ITEMS
          AVERAGE PER CENT CORRECT      93.1
          CORRECT LATENCY IN SECS.       1.6 AVG.     0.54 S.D.
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               LESSON  33    DATA FOR  29  STUDENTS

ALL ITEM TYPES                             156 ITEMS
               AVERAGE PER CENT CORRECT    72.4
               CORRECT LATENCY IN SECS.     1.6 AVG.    1.09 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN              13 ITEMS
               AVERAGE PER CENT CORRECT    62.6
               CORRECT LATENCY IN SECS.     0.8 AVG.    0.18 S.D.

TRANSLATE FROM TELETYPE ENGLISH             16 ITEMS
               AVERAGE PER CENT CORRECT    70.3
               CORRECT LATENCY IN SECS.     0.3 AVG.    0.24 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN               8 ITEMS
               AVERAGE PER CENT CORRECT    78.9
               CORRECT LATENCY IN SECS.     0.6 AVG.    0.14 S.D.

TRANSFORM FROM TELETYPE RUSSIAN             18 ITEMS
               AVERAGE PER CENT CORRECT    62.8
               CORRECT LATENCY IN SECS.     1.0 AVG.    0.19 S.D.

TRANSFORM FROM SPOKEN RUSSIAN               11 ITEMS
               AVERAGE PER CENT CORRECT    53.8
               CORRECT LATENCY IN SECS.     0.8 AVG.    0.09 S.D.

INFLECT TELETYPE RUSSIAN                    88 ITEMS
               AVERAGE PER CENT CORRECT    77.0
               CORRECT LATENCY IN SECS.     2.2 AVG.    1.12 S.D.

OTHER ITEM TYPES                             2 ITEMS
               AVERAGE PER CENT CORRECT   100.0
               CORRECT LATENCY IN SECS.     1.3 AVG.    0.78 S.D.
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          LESSON  34    DATA FOR  21  STUDENTS

ALL ITEM TYPES                               140 ITEMS
          AVERAGE PER CENT CORRECT      83.7
          CORRECT LATENCY IN SECS.       1.6 AVG.      1.89 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                16 ITEMS
          AVERAGE PER CENT CORRECT      85.1
          CORRECT LATENCY IN SECS.       0.8 AVG.      0.20 S.D.

TRANSLATE FROM TELETYPE ENGLISH               15 ITEMS
          AVERAGE PER CENT CORRECT      76.8
          CORRECT LATENCY IN SECS.       0.9 AVG.      0.26 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                13 ITEMS
          AVERAGE PER CENT CORRECT      78.8
          CORRECT LATENCY IN SECS.       0.6 AVG.      0.13 S.D.

TRANSFORM FROM TELETYPE RUSSIAN                3 ITEMS
          AVERAGE PER CENT CORRECT      88.9
          CORRECT LATENCY IN SECS.       1.1 AVG.      0.32 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                  0 ITEMS



INFLECT TELETYPE RUSSIAN                      86 ITEMS
          AVERAGE PER CENT CORRECT      85.1
          CORRECT LATENCY IN SECS.       1.9 AVG.      0.95 S.D.

OTHER ITEM TYPES                               7 ITEMS
          AVERAGE PER CENT CORRECT      84.9
          CORRECT LATENCY IN SECS.       3.8 AVG.      7.57 S.D.
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                    LESSON  35    DATA FOR  26  STUDENTS

ALL ITEM TYPES                                 127 ITEMS
                    AVERAGE PER CENT CORRECT   79.9
                    CORRECT LATENCY IN SECS.    1.3 AVG.    0.88 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                   3 ITEMS
                    AVERAGE PER CENT CORRECT   84.6
                    CORRECT LATENCY IN SECS.    0.7 AVG.    0.06 S.D.

TRANSLATE FROM TELETYPE ENGLISH                  2 ITEMS
                    AVERAGE PER CENT CORRECT   48.1
                    CORRECT LATENCY IN SECS.    1.0 AVG.    0.07 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                  42 ITEMS
                    AVERAGE PER CENT CORRECT   77.3
                    CORRECT LATENCY IN SECS.    0.6 AVG.    0.14 S.D.

TRANSFORM FROM TELETYPE RUSSIAN                  0 ITEMS



TRANSFORM FROM SPOKEN RUSSIAN                   13 ITEMS
                    AVERAGE PER CENT CORRECT   78.7
                    CORRECT LATENCY IN SECS.    1.0 AVG.    0.51 S.D.

INFLECT TELETYPE RUSSIAN                        60 ITEMS
                    AVERAGE PER CENT CORRECT   81.9
                    CORRECT LATENCY IN SECS.    1.9 AVG.    0.96 S.D.

OTHER ITEM TYPES                                 7 ITEMS
                    AVERAGE PER CENT CORRECT   87.4
                    CORRECT LATENCY IN SECS.    1.3 AVG.    0.41 S.D.
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          LESSON  37    DATA FOR  20  STUDENTS

ALL ITEM TYPES                           20 ITEMS
          AVERAGE PER CENT CORRECT    41.5
          CORRECT LATENCY IN SECS.     0.9 AVG.     0.13 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN            0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH          20 ITEMS
          AVERAGE PER CENT CORRECT    41.5
          CORRECT LATENCY IN SECS.     0.9 AVG.     0.13 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN            0 ITEMS



TRANSFORM FROM TELETYPE RUSSIAN           0 ITEMS



TRANSFORM FROM SPOKEN RUSSIAN             0 ITEMS



INFLECT TELETYPE RUSSIAN                  0 ITEMS



OTHER ITEM TYPES                          0 ITEMS
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         LESSON  39    DATA FOR  27  STUDENTS

ALL ITEM TYPES                              124 ITEMS
         AVERAGE PER CENT CORRECT         87.6
         CORRECT LATENCY IN SECS.          1.1 AVG.      0.76 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN               16 ITEMS
         AVERAGE PER CENT CORRECT         85.4
         CORRECT LATENCY IN SECS.          0.7 AVG.      0.30 S.D.

TRANSLATE FROM TELETYPE ENGLISH              26 ITEMS
         AVERAGE PER CENT CORRECT         87.5
         CORRECT LATENCY IN SECS.          0.7 AVG.      0.17 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN               16 ITEMS
         AVERAGE PER CENT CORRECT         82.0
         CORRECT LATENCY IN SECS.          0.5 AVG.      0.13 S.D.

TRANSFORM FROM TELETYPE RUSSIAN               3 ITEMS
         AVERAGE PER CENT CORRECT         81.5
         CORRECT LATENCY IN SECS.          0.9 AVG.      0.12 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                 0 ITEMS



INFLECT TELETYPE RUSSIAN                     47 ITEMS
         AVERAGE PER CENT CORRECT         90.6
         CORRECT LATENCY IN SECS.          1.5 AVG.      0.62 S.D.

OTHER ITEM TYPES                             16 ITEMS
         AVERAGE PER CENT CORRECT         88.0
         CORRECT LATENCY IN SECS.          1.5 AVG.      1.40 S.D.
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          LESSON  40    DATA FOR  25  STUDENTS

ALL ITEM TYPES                               113 ITEMS
          AVERAGE PER CENT CORRECT          87.2
          CORRECT LATENCY IN SECS.           1.3 AVG.     0.84 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                15 ITEMS
          AVERAGE PER CENT CORRECT          83.5
          CORRECT LATENCY IN SECS.           0.7 AVG.     0.30 S.D.

TRANSLATE FROM TELETYPE ENGLISH               12 ITEMS
          AVERAGE PER CENT CORRECT          69.3
          CORRECT LATENCY IN SECS.           0.9 AVG.     0.14 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                16 ITEMS
          AVERAGE PER CENT CORRECT          88.8
          CORRECT LATENCY IN SECS.           0.6 AVG.     0.11 S.D.

TRANSFORM FROM TELETYPE RUSSIAN                3 ITEMS
          AVERAGE PER CENT CORRECT          88.0
          CORRECT LATENCY IN SECS.           0.9 AVG.     0.06 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                  3 ITEMS
          AVERAGE PER CENT CORRECT          85.3
          CORRECT LATENCY IN SECS.           0.7 AVG.     0.10 S.D.

INFLECT TELETYPE RUSSIAN                      61 ITEMS
          AVERAGE PER CENT CORRECT          91.1
          CORRECT LATENCY IN SECS.           1.7 AVG.     0.87 S.D.

OTHER ITEM TYPES                               3 ITEMS
          AVERAGE PER CENT CORRECT          89.3
          CORRECT LATENCY IN SECS.           1.6 AVG.     0.93 S.D.
          LESSON  41    DATA FOR  28  STUDENTS

ALL ITEM TYPES                           134 ITEMS
          AVERAGE PER CENT CORRECT    87.2
          CORRECT LATENCY IN SECS.     1.6 AVG.     0.94 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN             4 ITEMS
          AVERAGE PER CENT CORRECT    78.6
          CORRECT LATENCY IN SECS.     0.9 AVG.     0.15 S.D.

TRANSLATE FROM TELETYPE ENGLISH           15 ITEMS
          AVERAGE PER CENT CORRECT    91.4
          CORRECT LATENCY IN SECS.     0.8 AVG.     0.21 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN            17 ITEMS
          AVERAGE PER CENT CORRECT    76.5
          CORRECT LATENCY IN SECS.     0.6 AVG.     0.11 S.D.

TRANSFORM FROM TELETYPE RUSSIAN            3 ITEMS
          AVERAGE PER CENT CORRECT    76.2
          CORRECT LATENCY IN SECS.     1.0 AVG.     0.15 S.D.

TRANSFORM FROM SPOKEN RUSSIAN              3 ITEMS
          AVERAGE PER CENT CORRECT    90.5
          CORRECT LATENCY IN SECS.     1.0 AVG.     0.47 S.D.

INFLECT TELETYPE RUSSIAN                  82 ITEMS
          AVERAGE PER CENT CORRECT    89.2
          CORRECT LATENCY IN SECS.     2.0 AVG.     0.79 S.D.

OTHER ITEM TYPES                          10 ITEMS
          AVERAGE PER CENT CORRECT    87.9
          CORRECT LATENCY IN SECS.     2.4 AVG.     1.33 S.D.
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            LESSON  42    DATA FOR  28  STUDENTS

ALL ITEM TYPES                              123 ITEMS
            AVERAGE PER CENT CORRECT      87.5
            CORRECT LATENCY IN SECS.       1.3 AVG.     0.97 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH              69 ITEMS
            AVERAGE PER CENT CORRECT      81.8
            CORRECT LATENCY IN SECS.       0.9 AVG.     0.23 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                0 ITEMS



TRANSFORM FROM TELETYPE RUSSIAN               0 ITEMS



TRANSFORM FROM SPOKEN RUSSIAN                 0 ITEMS



INFLECT TELETYPE RUSSIAN                     54 ITEMS
            AVERAGE PER CENT CORRECT      94.6
            CORRECT LATENCY IN SECS.       1.9 AVG.     1.21 S.D.

OTHER ITEM TYPES                              0 ITEMS
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          LESSON  43    DATA FOR  29  STUDENTS

ALL ITEM TYPES                              163 ITEMS
          AVERAGE PER CENT CORRECT         82.6
          CORRECT LATENCY IN SECS.          1.1 AVG.    0.56 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH             104 ITEMS
          AVERAGE PER CENT CORRECT         75.1
          CORRECT LATENCY IN SECS.          0.9 AVG.    0.27 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                0 ITEMS



TRANSFORM FROM TELETYPE RUSSIAN               0 ITEMS



TRANSFORM FROM SPOKEN RUSSIAN                 0 ITEMS



INFLECT TELETYPE RUSSIAN                     59 ITEMS
          AVERAGE PER CENT CORRECT         95.9
          CORRECT LATENCY IN SECS.          1.4 AVG.    0.74 S.D.

OTHER ITEM TYPES                              0 ITEMS
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               LESSON  44    DATA FOR  29  STUDENTS

ALL ITEM TYPES                          128 ITEMS
          AVERAGE PER CENT CORRECT     89.1
          CORRECT LATENCY IN SECS.      1.0 AVG.    0.51 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN            0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH          58 ITEMS
          AVERAGE PER CENT CORRECT     88.7
          CORRECT LATENCY IN SECS.      0.8 AVG.    0.23 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN            0 ITEMS



TRANSFORM FROM TELETYPE RUSSIAN           0 ITEMS



TRANSFORM FROM SPOKEN RUSSIAN            18 ITEMS
          AVERAGE PER CENT CORRECT     65.7
          CORRECT LATENCY IN SECS.      0.8 AVG.    0.15 S.D.

INFLECT TELETYPE RUSSIAN                 51 ITEMS
          AVERAGE PER CENT CORRECT     97.8
          CORRECT LATENCY IN SECS.      1.2 AVG.    0.63 S.D.

OTHER ITEM TYPES                          1 ITEMS
          AVERAGE PER CENT CORRECT     96.6
          CORRECT LATENCY IN SECS.      2.9 AVG.    0.00 S.D.
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```
           LESSON  45    DATA FOR  29  STUDENTS

ALL ITEM TYPES                             277 ITEMS
           AVERAGE PER CENT CORRECT       78.6
           CORRECT LATENCY IN SECS.        2.1 AVG.     1.15 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN               0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH             25 ITEMS
           AVERAGE PER CENT CORRECT       74.6
           CORRECT LATENCY IN SECS.        0.9 AVG.     0.14 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN               0 ITEMS



TRANSFORM FROM TELETYPE RUSSIAN             26 ITEMS
           AVERAGE PER CENT CORRECT       67.4
           CORRECT LATENCY IN SECS.        2.1 AVG.     0.51 S.D.

TRANSFORM FROM SPOKEN RUSSIAN               18 ITEMS
           AVERAGE PER CENT CORRECT       51.7
           CORRECT LATENCY IN SECS.        0.8 AVG.     0.35 S.D.

INFLECT TELETYPE RUSSIAN                   208 ITEMS
           AVERAGE PER CENT CORRECT       82.8
           CORRECT LATENCY IN SECS.        2.3 AVG.     1.15 S.D.

OTHER ITEM TYPES                             0 ITEMS
```

```
          LESSON  46    DATA FOR  22  STUDENTS

ALL ITEM TYPES                            266 ITEMS
          AVERAGE PER CENT CORRECT    87.0
          CORRECT LATENCY IN SECS.     1.8 AVG.     0.92 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN              0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH            25 ITEMS
          AVERAGE PER CENT CORRECT    70.0
          CORRECT LATENCY IN SECS.     0.9 AVG.     0.23 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN              0 ITEMS



TRANSFORM FROM TELETYPE RUSSIAN             0 ITEMS



TRANSFORM FROM SPOKEN RUSSIAN              10 ITEMS
          AVERAGE PER CENT CORRECT    64.6
          CORRECT LATENCY IN SECS.     0.7 AVG.     0.11 S.D.

INFLECT TELETYPE RUSSIAN                  230 ITEMS
          AVERAGE PER CENT CORRECT    89.8
          CORRECT LATENCY IN SECS.     1.9 AVG.     0.92 S.D.

OTHER ITEM TYPES                            1 ITEMS
          AVERAGE PER CENT CORRECT    95.5
          CORRECT LATENCY IN SECS.     2.3 AVG.     0.00 S.D.
```

Appendix 5

Second Quarter Lesson Summary Analysis

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      LESSONS  47 TO  92

ALL ITEM TYPES                              3242 ITEMS
             AVERAGE PER CENT CORRECT    83.4
             CORRECT LATENCY IN SECS.     1.5 AVG.     1.11 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN             310 ITEMS
             AVERAGE PER CENT CORRECT    75.0
             CORRECT LATENCY IN SECS.     0.8 AVG.     0.42 S.D.

TRANSLATE FROM TELETYPE ENGLISH             1084 ITEMS
             AVERAGE PER CENT CORRECT    81.0
             CORRECT LATENCY IN SECS.     0.8 AVG.     0.26 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN             275 ITEMS
             AVERAGE PER CENT CORRECT    90.8
             CORRECT LATENCY IN SECS.     0.4 AVG.     0.17 S.D.

TRANSFORM FROM TELETYPE RUSSIAN            378 ITEMS
             AVERAGE PER CENT CORRECT    92.5
             CORRECT LATENCY IN SECS.     0.9 AVG.     0.33 S.D.

TRANSFORM FROM SPOKEN RUSSIAN               92 ITEMS
             AVERAGE PER CENT CORRECT    81.7
             CORRECT LATENCY IN SECS.     0.8 AVG.     0.24 S.D.

INFLECT TELETYPE RUSSIAN                    2792 ITEMS
             AVERAGE PER CENT CORRECT    84.6
             CORRECT LATENCY IN SECS.     2.1 AVG.     1.19 S.D.

OTHER ITEM TYPES                           391 ITEMS
             AVERAGE PER CENT CORRECT    84.8
             CORRECT LATENCY IN SECS.     2.2 AVG.     1.05 S.D.
```

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                LESSON  53    DATA FOR  26  STUDENTS

ALL ITEM TYPES                               145 ITEMS
                AVERAGE PER CENT CORRECT    87.0
                CORRECT LATENCY IN SECS.     1.6 AVG.     1.13 S.D.


TYPE ANSWERS TO SPOKEN RUSSIAN                 7 ITEMS
                AVERAGE PER CENT CORRECT    90.1
                CORRECT LATENCY IN SECS.     0.9 AVG.     0.24 S.D.


TRANSLATE FROM TELETYPE ENGLISH               22 ITEMS
                AVERAGE PER CENT CORRECT    82.0
                CORRECT LATENCY IN SECS.     0.9 AVG.     0.34 S.D.


TRANSCRIBE FROM SPOKEN RUSSIAN                13 ITEMS
                AVERAGE PER CENT CORRECT    90.8
                CORRECT LATENCY IN SECS.     0.6 AVG.     0.18 S.D.


TRANSFORM FROM TELETYPE RUSSIAN                2 ITEMS
                AVERAGE PER CENT CORRECT   100.0
                CORRECT LATENCY IN SECS.     0.9 AVG.     0.14 S.D.


TRANSFORM FROM SPOKEN RUSSIAN                  6 ITEMS
                AVERAGE PER CENT CORRECT    93.0
                CORRECT LATENCY IN SECS.     0.6 AVG.     0.09 S.D.


INFLECT TELETYPE RUSSIAN                      87 ITEMS
                AVERAGE PER CENT CORRECT    85.8
                CORRECT LATENCY IN SECS.     2.1 AVG.     1.16 S.D.


OTHER ITEM TYPES                               8 ITEMS
                AVERAGE PER CENT CORRECT    97.1
                CORRECT LATENCY IN SECS.     1.6 AVG.     0.76 S.D.
```

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          LESSON  55    DATA FOR  26  STUDENTS

ALL ITEM TYPES                              137 ITEMS
          AVERAGE PER CENT CORRECT    84.4
          CORRECT LATENCY IN SECS.     1.4 AVG.    1.04 S.D.


TYPE ANSWERS TO SPOKEN RUSSIAN                9 ITEMS
          AVERAGE PER CENT CORRECT    65.4
          CORRECT LATENCY IN SECS.     1.0 AVG.    0.34 S.D.


TRANSLATE FROM TELETYPE ENGLISH              28 ITEMS
          AVERAGE PER CENT CORRECT    80.8
          CORRECT LATENCY IN SECS.     0.7 AVG.    0.22 S.D.


TRANSCRIBE FROM SPOKEN RUSSIAN                9 ITEMS
          AVERAGE PER CENT CORRECT    85.9
          CORRECT LATENCY IN SECS.     0.7 AVG.    0.16 S.D.


TRANSFORM FROM TELETYPE RUSSIAN              13 ITEMS
          AVERAGE PER CENT CORRECT    83.7
          CORRECT LATENCY IN SECS.     0.8 AVG.    0.34 S.D.


TRANSFORM FROM SPOKEN RUSSIAN                10 ITEMS
          AVERAGE PER CENT CORRECT    80.4
          CORRECT LATENCY IN SECS.     0.9 AVG.    0.21 S.D.


INFLECT TELETYPE RUSSIAN                     61 ITEMS
          AVERAGE PER CENT CORRECT    88.5
          CORRECT LATENCY IN SECS.     2.1 AVG.    1.17 S.D.


OTHER ITEM TYPES                              7 ITEMS
          AVERAGE PER CENT CORRECT    92.3
          CORRECT LATENCY IN SECS.     1.7 AVG.    0.78 S.D.
          LESSON  56    DATA FOR  27  STUDENTS

ALL ITEM TYPES                             156 ITEMS
          AVERAGE PER CENT CORRECT        84.2
          CORRECT LATENCY IN SECS.         2.1 AVG.     1.61 S.D.


TYPE ANSWERS TO SPOKEN RUSSIAN               2 ITEMS
          AVERAGE PER CENT CORRECT        88.9
          CORRECT LATENCY IN SECS.         0.7 AVG.     0.14 S.D.


TRANSLATE FROM TELETYPE ENGLISH             20 ITEMS
          AVERAGE PER CENT CORRECT        87.6
          CORRECT LATENCY IN SECS.         0.8 AVG.     0.25 S.D.


TRANSCRIBE FROM SPOKEN RUSSIAN              19 ITEMS
          AVERAGE PER CENT CORRECT        83.4
          CORRECT LATENCY IN SECS.         0.7 AVG.     0.16 S.D.


TRANSFORM FROM TELETYPE RUSSIAN              7 ITEMS
          AVERAGE PER CENT CORRECT        86.3
          CORRECT LATENCY IN SECS.         0.7 AVG.     0.13 S.D.


TRANSFORM FROM SPOKEN RUSSIAN               10 ITEMS
          AVERAGE PER CENT CORRECT        83.0
          CORRECT LATENCY IN SECS.         0.6 AVG.     0.11 S.D.


INFLECT TELETYPE RUSSIAN                    88 ITEMS
          AVERAGE PER CENT CORRECT        81.9
          CORRECT LATENCY IN SECS.         3.1 AVG.     1.51 S.D.


OTHER ITEM TYPES                            10 ITEMS
          AVERAGE PER CENT CORRECT        98.2
          CORRECT LATENCY IN SECS.         1.5 AVG.     0.59 S.D.
          LESSON  57    DATA FOR  17  STUDENTS

ALL ITEM TYPES                             103 ITEMS
          AVERAGE PER CENT CORRECT    82.4
          CORRECT LATENCY IN SECS.     1.8 AVG.     1.43 S.D.


TYPE ANSWERS TO SPOKEN RUSSIAN              13 ITEMS
          AVERAGE PER CENT CORRECT    52.0
          CORRECT LATENCY IN SECS.     0.7 AVG.     0.33 S.D.


TRANSLATE FROM TELETYPE ENGLISH             12 ITEMS
          AVERAGE PER CENT CORRECT    78.4
          CORRECT LATENCY IN SECS.     0.8 AVG.     0.26 S.D.


TRANSCRIBE FROM SPOKEN RUSSIAN               8 ITEMS
          AVERAGE PER CENT CORRECT    88.2
          CORRECT LATENCY IN SECS.     0.7 AVG.     0.12 S.D.


TRANSFORM FROM TELETYPE RUSSIAN              3 ITEMS
          AVERAGE PER CENT CORRECT    94.1
          CORRECT LATENCY IN SECS.     0.6 AVG.     0.06 S.D.


TRANSFORM FROM SPOKEN RUSSIAN                3 ITEMS
          AVERAGE PER CENT CORRECT    62.8
          CORRECT LATENCY IN SECS.     0.6 AVG.     0.06 S.D.


INFLECT TELETYPE RUSSIAN                    52 ITEMS
          AVERAGE PER CENT CORRECT    88.2
          CORRECT LATENCY IN SECS.     2.7 AVG.     1.37 S.D.


OTHER ITEM TYPES                            12 ITEMS
          AVERAGE PER CENT CORRECT    92.1
          CORRECT LATENCY IN SECS.     1.7 AVG.     1.45 S.D.
          LESSON  58    DATA FOR  15  STUDENTS

ALL ITEM TYPES                                190 ITEMS
          AVERAGE PER CENT CORRECT          82.5
          CORRECT LATENCY IN SECS.           1.2 AVG.     0.77 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                  0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH                72 ITEMS
          AVERAGE PER CENT CORRECT          83.5
          CORRECT LATENCY IN SECS.           0.8 AVG.     0.21 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                  0 ITEMS



TRANSFORM FROM TELETYPE RUSSIAN                 3 ITEMS
          AVERAGE PER CENT CORRECT          88.9
          CORRECT LATENCY IN SECS.           0.6 AVG.     0.06 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                   0 ITEMS



INFLECT TELETYPE RUSSIAN                      113 ITEMS
          AVERAGE PER CENT CORRECT          82.1
          CORRECT LATENCY IN SECS.           1.5 AVG.     0.89 S.D.

OTHER ITEM TYPES                                2 ITEMS
          AVERAGE PER CENT CORRECT          56.0
          CORRECT LATENCY IN SECS.           1.6 AVG.     0.85 S.D.
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         LESSON  59    DATA FOR  28  STUDENTS

ALL ITEM TYPES                            116 ITEMS
         AVERAGE PER CENT CORRECT    83.7
         CORRECT LATENCY IN SECS.     1.7 AVG.    1.42 S.D.


TYPE ANSWERS TO SPOKEN RUSSIAN              6 ITEMS
         AVERAGE PER CENT CORRECT    68.5
         CORRECT LATENCY IN SECS.     0.7 AVG.    0.24 S.D.


TRANSLATE FROM TELETYPE ENGLISH            26 ITEMS
         AVERAGE PER CENT CORRECT    73.9
         CORRECT LATENCY IN SECS.     0.7 AVG.    0.30 S.D.


TRANSCRIBE FROM SPOKEN RUSSIAN              7 ITEMS
         AVERAGE PER CENT CORRECT    84.2
         CORRECT LATENCY IN SECS.     0.7 AVG.    0.20 S.D.


TRANSFORM FROM TELETYPE RUSSIAN             9 ITEMS
         AVERAGE PER CENT CORRECT    83.3
         CORRECT LATENCY IN SECS.     1.0 AVG.    0.35 S.D.


TRANSFORM FROM SPOKEN RUSSIAN               0 ITEMS




INFLECT TELETYPE RUSSIAN                   55 ITEMS
         AVERAGE PER CENT CORRECT    87.3
         CORRECT LATENCY IN SECS.     2.6 AVG.    1.37 S.D.


OTHER ITEM TYPES                           13 ITEMS
         AVERAGE PER CENT CORRECT    95.6
         CORRECT LATENCY IN SECS.     1.9 AVG.    1.82 S.D.
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                LESSON  60    DATA FOR  28  STUDENTS

ALL ITEM TYPES                                  131 ITEMS
                AVERAGE PER CENT CORRECT       83.2
                CORRECT LATENCY IN SECS.        1.8 AVG.      1.34 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                   17 ITEMS
                AVERAGE PER CENT CORRECT       70.2
                CORRECT LATENCY IN SECS.        0.7 AVG.      0.26 S.D.

TRANSLATE FROM TELETYPE ENGLISH                  22 ITEMS
                AVERAGE PER CENT CORRECT       84.9
                CORRECT LATENCY IN SECS.        0.7 AVG.      0.21 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                    3 ITEMS
                AVERAGE PER CENT CORRECT       91.7
                CORRECT LATENCY IN SECS.        0.6 AVG.      0.06 S.D.

TRANSFORM FROM TELETYPE RUSSIAN                  22 ITEMS
                AVERAGE PER CENT CORRECT       89.4
                CORRECT LATENCY IN SECS.        1.0 AVG.      0.30 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                     0 ITEMS



INFLECT TELETYPE RUSSIAN                         62 ITEMS
                AVERAGE PER CENT CORRECT       82.4
                CORRECT LATENCY IN SECS.        2.7 AVG.      1.35 S.D.

OTHER ITEM TYPES                                  5 ITEMS
                AVERAGE PER CENT CORRECT       96.4
                CORRECT LATENCY IN SECS.        1.6 AVG.      0.38 S.D.
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          LESSON  61    DATA FOR  28  STUDENTS

ALL ITEM TYPES                             117 ITEMS
          AVERAGE PER CENT CORRECT    86.8
          CORRECT LATENCY IN SECS.     1.2 AVG.     0.96 S.D.


TYPE ANSWERS TO SPOKEN RUSSIAN              22 ITEMS
          AVERAGE PER CENT CORRECT    77.6
          CORRECT LATENCY IN SECS.     0.8 AVG.     0.29 S.D.


TRANSLATE FROM TELETYPE ENGLISH             12 ITEMS
          AVERAGE PER CENT CORRECT    81.8
          CORRECT LATENCY IN SECS.     0.7 AVG.     0.19 S.D.


TRANSCRIBE FROM SPOKEN RUSSIAN               7 ITEMS
          AVERAGE PER CENT CORRECT    90.3
          CORRECT LATENCY IN SECS.     0.7 AVG.     0.08 S.D.


TRANSFORM FROM TELETYPE RUSSIAN             18 ITEMS
          AVERAGE PER CENT CORRECT    91.1
          CORRECT LATENCY IN SECS.     0.8 AVG.     0.15 S.D.


TRANSFORM FROM SPOKEN RUSSIAN                6 ITEMS
          AVERAGE PER CENT CORRECT    92.3
          CORRECT LATENCY IN SECS.     0.7 AVG.     0.20 S.D.


INFLECT TELETYPE RUSSIAN                    46 ITEMS
          AVERAGE PER CENT CORRECT    88.9
          CORRECT LATENCY IN SECS.     1.6 AVG.     1.05 S.D.


OTHER ITEM TYPES                             6 ITEMS
          AVERAGE PER CENT CORRECT    91.7
          CORRECT LATENCY IN SECS.     3.2 AVG.     1.55 S.D.
```

```
               LESSON  62    DATA FOR  28  STUDENTS

ALL ITEM TYPES                                135 ITEMS
               AVERAGE PER CENT CORRECT    83.4
               CORRECT LATENCY IN SECS.     1.7 AVG.     1.10 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                 12 ITEMS
               AVERAGE PER CENT CORRECT    72.6
               CORRECT LATENCY IN SECS.     0.8 AVG.     0.35 S.D.

TRANSLATE FROM TELETYPE ENGLISH                11 ITEMS
               AVERAGE PER CENT CORRECT    88.0
               CORRECT LATENCY IN SECS.     0.7 AVG.     0.15 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                  4 ITEMS
               AVERAGE PER CENT CORRECT    81.3
               CORRECT LATENCY IN SECS.     0.6 AVG.     0.13 S.D.

TRANSFORM FROM TELETYPE RUSSIAN                 9 ITEMS
               AVERAGE PER CENT CORRECT    77.4
               CORRECT LATENCY IN SECS.     1.0 AVG.     0.35 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                  14 ITEMS
               AVERAGE PER CENT CORRECT    89.0
               CORRECT LATENCY IN SECS.     0.8 AVG.     0.16 S.D.

INFLECT TELETYPE RUSSIAN                       77 ITEMS
               AVERAGE PER CENT CORRECT    83.9
               CORRECT LATENCY IN SECS.     2.2 AVG.     1.11 S.D.

OTHER ITEM TYPES                                8 ITEMS
               AVERAGE PER CENT CORRECT    86.2
               CORRECT LATENCY IN SECS.     2.3 AVG.     0.77 S.D.
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                  LESSON  63    DATA FOR  28  STUDENTS

ALL ITEM TYPES                              127 ITEMS
                  AVERAGE PER CENT CORRECT    80.2
                  CORRECT LATENCY IN SECS.     1.1 AVG.     0.80 S.D.


TYPE ANSWERS TO SPOKEN RUSSIAN               29 ITEMS
                  AVERAGE PER CENT CORRECT    78.0
                  CORRECT LATENCY IN SECS.     0.9 AVG.     0.48 S.D.


TRANSLATE FROM TELETYPE ENGLISH              42 ITEMS
                  AVERAGE PER CENT CORRECT    79.5
                  CORRECT LATENCY IN SECS.     0.8 AVG.     0.23 S.D.


TRANSCRIBE FROM SPOKEN RUSSIAN                8 ITEMS
                  AVERAGE PER CENT CORRECT    94.2
                  CORRECT LATENCY IN SECS.     0.6 AVG.     0.12 S.D.


TRANSFORM FROM TELETYPE RUSSIAN               3 ITEMS
                  AVERAGE PER CENT CORRECT    91.7
                  CORRECT LATENCY IN SECS.     1.1 AVG.     0.55 S.D.


TRANSFORM FROM SPOKEN RUSSIAN                 0 ITEMS




INFLECT TELETYPE RUSSIAN                     41 ITEMS
                  AVERAGE PER CENT CORRECT    79.4
                  CORRECT LATENCY IN SECS.     1.7 AVG.     1.10 S.D.


OTHER ITEM TYPES                              4 ITEMS
                  AVERAGE PER CENT CORRECT    75.6
                  CORRECT LATENCY IN SECS.     1.7 AVG.     0.62 S.D.
```

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          LESSON  64    DATA FOR  28  STUDENTS

ALL ITEM TYPES                             169 ITEMS
          AVERAGE PER CENT CORRECT    84.3
          CORRECT LATENCY IN SECS.     1.9 AVG.     1.31 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN              13 ITEMS
          AVERAGE PER CENT CORRECT    70.9
          CORRECT LATENCY IN SECS.     0.9 AVG.     0.18 S.D.

TRANSLATE FROM TELETYPE ENGLISH             26 ITEMS
          AVERAGE PER CENT CORRECT    89.6
          CORRECT LATENCY IN SECS.     0.7 AVG.     0.18 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN               7 ITEMS
          AVERAGE PER CENT CORRECT    89.3
          CORRECT LATENCY IN SECS.     0.6 AVG.     0.19 S.D.

TRANSFORM FROM TELETYPE RUSSIAN             24 ITEMS
          AVERAGE PER CENT CORRECT    94.6
          CORRECT LATENCY IN SECS.     0.8 AVG.     0.27 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                0 ITEMS



INFLECT TELETYPE RUSSIAN                    99 ITEMS
          AVERAGE PER CENT CORRECT    81.7
          CORRECT LATENCY IN SECS.     2.6 AVG.     1.56 S.D.

OTHER ITEM TYPES                             0 ITEMS
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```
          LESSON  63    DATA FOR  28  STUDENTS

ALL ITEM TYPES                          148 ITEMS
          AVERAGE PER CENT CORRECT    86.3
          CORRECT LATENCY IN SECS.      1.7 AVG.     1.10 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN            0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH          30 ITEMS
          AVERAGE PER CENT CORRECT    86.3
          CORRECT LATENCY IN SECS.      0.8 AVG.     0.18 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN            0 ITEMS



TRANSFORM FROM TELETYPE RUSSIAN           8 ITEMS
          AVERAGE PER CENT CORRECT    94.2
          CORRECT LATENCY IN SECS.      0.9 AVG.     0.24 S.D.

TRANSFORM FROM SPOKEN RUSSIAN             8 ITEMS
          AVERAGE PER CENT CORRECT    87.9
          CORRECT LATENCY IN SECS.      0.8 AVG.     0.18 S.D.

INFLECT TELETYPE RUSSIAN                 93 ITEMS
          AVERAGE PER CENT CORRECT    86.9
          CORRECT LATENCY IN SECS.      2.1 AVG.     1.12 S.D.

OTHER ITEM TYPES                          9 ITEMS
          AVERAGE PER CENT CORRECT    81.8
          CORRECT LATENCY IN SECS.      2.3 AVG.     0.87 S.D.
          LESSON  66    DATA FOR  26  STUDENTS

ALL ITEM TYPES                             128 ITEMS
          AVERAGE PER CENT CORRECT        81.7
          CORRECT LATENCY IN SECS.         1.5 AVG.     0.91 S.D.


TYPE ANSWERS TO SPOKEN RUSSIAN               7 ITEMS
          AVERAGE PER CENT CORRECT        80.8
          CORRECT LATENCY IN SECS.         1.2 AVG.     0.46 S.D.


TRANSLATE FROM TELETYPE ENGLISH             29 ITEMS
          AVERAGE PER CENT CORRECT        80.6
          CORRECT LATENCY IN SECS.         0.8 AVG.     0.21 S.D.


TRANSCRIBE FROM SPOKEN RUSSIAN               3 ITEMS
          AVERAGE PER CENT CORRECT        94.9
          CORRECT LATENCY IN SECS.         0.7 AVG.     0.23 S.D.


TRANSFORM FROM TELETYPE RUSSIAN              4 ITEMS
          AVERAGE PER CENT CORRECT        76.0
          CORRECT LATENCY IN SECS.         1.2 AVG.     0.41 S.D.


TRANSFORM FROM SPOKEN RUSSIAN                7 ITEMS
          AVERAGE PER CENT CORRECT        69.8
          CORRECT LATENCY IN SECS.         0.8 AVG.     0.20 S.D.


INFLECT TELETYPE RUSSIAN                    78 ITEMS
          AVERAGE PER CENT CORRECT        83.0
          CORRECT LATENCY IN SECS.         1.9 AVG.     0.92 S.D.


OTHER ITEM TYPES                             0 ITEMS
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          LESSON  67    DATA FOR  22  STUDENTS

ALL ITEM TYPES                                 149 ITEMS
          AVERAGE PER CENT CORRECT      82.5
          CORRECT LATENCY IN SECS.       1.5 AVG.     1.23 S.D.


TYPE ANSWERS TO SPOKEN RUSSIAN                  20 ITEMS
          AVERAGE PER CENT CORRECT      80.7
          CORRECT LATENCY IN SECS.       0.7 AVG.     0.23 S.D.


TRANSLATE FROM TELETYPE ENGLISH                 29 ITEMS
          AVERAGE PER CENT CORRECT      75.9
          CORRECT LATENCY IN SECS.       0.8 AVG.     0.23 S.D.


TRANSCRIBE FROM SPOKEN RUSSIAN                   5 ITEMS
          AVERAGE PER CENT CORRECT      96.4
          CORRECT LATENCY IN SECS.       0.6 AVG.     0.07 S.D.


TRANSFORM FROM TELETYPE RUSSIAN                  8 ITEMS
          AVERAGE PER CENT CORRECT      89.8
          CORRECT LATENCY IN SECS.       1.0 AVG.     0.42 S.D.


TRANSFORM FROM SPOKEN RUSSIAN                    1 ITEMS
          AVERAGE PER CENT CORRECT      86.4
          CORRECT LATENCY IN SECS.       1.0 AVG.     0.00 S.D.


INFLECT TELETYPE RUSSIAN                        79 ITEMS
          AVERAGE PER CENT CORRECT      84.7
          CORRECT LATENCY IN SECS.       2.1 AVG.     1.40 S.D.


OTHER ITEM TYPES                                 7 ITEMS
          AVERAGE PER CENT CORRECT      70.9
          CORRECT LATENCY IN SECS.       2.0 AVG.     1.03 S.D.
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               LESSON  69    DATA FOR  28  STUDENTS

      ALL ITEM TYPES                             169 ITEMS
               AVERAGE PER CENT CORRECT        83.5
               CORRECT LATENCY IN SECS.          1.9 AVG.     1.16 S.D.

      TYPE ANSWERS TO SPOKEN RUSSIAN              16 ITEMS
               AVERAGE PER CENT CORRECT        74.1
               CORRECT LATENCY IN SECS.          1.2 AVG.     1.25 S.D.

      TRANSLATE FROM TELETYPE ENGLISH             15 ITEMS
               AVERAGE PER CENT CORRECT        79.7
               CORRECT LATENCY IN SECS.          0.8 AVG.     0.18 S.D.

      TRANSCRIBE FROM SPOKEN RUSSIAN               8 ITEMS
               AVERAGE PER CENT CORRECT        92.4
               CORRECT LATENCY IN SECS.          0.6 AVG.     0.08 S.D.

      TRANSFORM FROM TELETYPE RUSSIAN             16 ITEMS
               AVERAGE PER CENT CORRECT        75.5
               CORRECT LATENCY IN SECS.          1.2 AVG.     0.55 S.D.

      TRANSFORM FROM SPOKEN RUSSIAN                0 ITEMS



      INFLECT TELETYPE RUSSIAN                   107 ITEMS
               AVERAGE PER CENT CORRECT        85.2
               CORRECT LATENCY IN SECS.          2.4 AVG.     1.04 S.D.

      OTHER ITEM TYPES                             7 ITEMS
               AVERAGE PER CENT CORRECT        95.4
               CORRECT LATENCY IN SECS.          1.3 AVG.     0.59 S.D.
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                LESSON  70    DATA FOR  28  STUDENTS

ALL ITEM TYPES                                    138 ITEMS
                AVERAGE PER CENT CORRECT     84.3
                CORRECT LATENCY IN SECS.      1.6 AVG.      1.17 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                     17 ITEMS
                AVERAGE PER CENT CORRECT     75.8
                CORRECT LATENCY IN SECS.      0.9 AVG.      0.33 S.D.

TRANSLATE FROM TELETYPE ENGLISH                    18 ITEMS
                AVERAGE PER CENT CORRECT     78.4
                CORRECT LATENCY IN SECS.      0.8 AVG.      0.31 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                     12 ITEMS
                AVERAGE PER CENT CORRECT     92.9
                CORRECT LATENCY IN SECS.      0.6 AVG.      0.09 S.D.

TRANSFORM FROM TELETYPE RUSSIAN                    18 ITEMS
                AVERAGE PER CENT CORRECT     84.9
                CORRECT LATENCY IN SECS.      0.9 AVG.      0.29 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                       0 ITEMS



INFLECT TELETYPE RUSSIAN                           67 ITEMS
                AVERAGE PER CENT CORRECT     85.6
                CORRECT LATENCY IN SECS.      2.3 AVG.      1.26 S.D.

OTHER ITEM TYPES                                    6 ITEMS
                AVERAGE PER CENT CORRECT     92.9
                CORRECT LATENCY IN SECS.      2.1 AVG.      0.86 S.D.
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          LESSON  71    DATA FOR  27  STUDENTS

ALL ITEM TYPES                           126 ITEMS
          AVERAGE PER CENT CORRECT      84.5
          CORRECT LATENCY IN SECS.       1.6 AVG.      1.27 S.D.


TYPE ANSWERS TO SPOKEN RUSSIAN            11 ITEMS
          AVERAGE PER CENT CORRECT      79.5
          CORRECT LATENCY IN SECS.       0.7 AVG.      0.20 S.D.


TRANSLATE FROM TELETYPE ENGLISH           21 ITEMS
          AVERAGE PER CENT CORRECT      90.3
          CORRECT LATENCY IN SECS.       0.7 AVG.      0.16 S.D.


TRANSCRIBE FROM SPOKEN RUSSIAN            14 ITEMS
          AVERAGE PER CENT CORRECT      88.1
          CORRECT LATENCY IN SECS.       0.7 AVG.      0.23 S.D.


TRANSFORM FROM TELETYPE RUSSIAN           12 ITEMS
          AVERAGE PER CENT CORRECT      82.1
          CORRECT LATENCY IN SECS.       1.1 AVG.      0.29 S.D.


TRANSFORM FROM SPOKEN RUSSIAN              0 ITEMS





INFLECT TELETYPE RUSSIAN                  42 ITEMS
          AVERAGE PER CENT CORRECT      83.2
          CORRECT LATENCY IN SECS.       2.3 AVG.      1.47 S.D.


OTHER ITEM TYPES                          26 ITEMS
          AVERAGE PER CENT CORRECT      83.3
          CORRECT LATENCY IN SECS.       2.3 AVG.      1.18 S.D.
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           LESSON  72    DATA FOR  25  STUDENTS

ALL ITEM TYPES                              134 ITEMS
           AVERAGE PER CENT CORRECT     84.1
           CORRECT LATENCY IN SECS.      1.3 AVG.      1.02 S.D.


TYPE ANSWERS TO SPOKEN RUSSIAN               20 ITEMS
           AVERAGE PER CENT CORRECT     82.6
           CORRECT LATENCY IN SECS.      0.6 AVG.      0.28 S.D.


TRANSLATE FROM TELETYPE ENGLISH              13 ITEMS
           AVERAGE PER CENT CORRECT     85.2
           CORRECT LATENCY IN SECS.      0.8 AVG.      0.24 S.D.


TRANSCRIBE FROM SPOKEN RUSSIAN               16 ITEMS
           AVERAGE PER CENT CORRECT     87.3
           CORRECT LATENCY IN SECS.      0.7 AVG.      0.15 S.D.


TRANSFORM FROM TELETYPE RUSSIAN              29 ITEMS
           AVERAGE PER CENT CORRECT     85.0
           CORRECT LATENCY IN SECS.      0.8 AVG.      0.31 S.D.


TRANSFORM FROM SPOKEN RUSSIAN                 0 ITEMS




INFLECT TELETYPE RUSSIAN                     50 ITEMS
           AVERAGE PER CENT CORRECT     81.4
           CORRECT LATENCY IN SECS.      2.2 AVG.      1.14 S.D.


OTHER ITEM TYPES                              6 ITEMS
           AVERAGE PER CENT CORRECT     97.3
           CORRECT LATENCY IN SECS.      1.9 AVG.      0.62 S.D.
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                LESSON  73    DATA FOR  26  STUDENTS

ALL ITEM TYPES                              143 ITEMS
             AVERAGE PER CENT CORRECT      84.5
             CORRECT LATENCY IN SECS.       1.6 AVG.     1.13 S.D.


TYPE ANSWERS TO SPOKEN RUSSIAN                9 ITEMS
             AVERAGE PER CENT CORRECT      82.5
             CORRECT LATENCY IN SECS.       0.7 AVG.     0.07 S.D.


TRANSLATE FROM TELETYPE ENGLISH              33 ITEMS
             AVERAGE PER CENT CORRECT      83.6
             CORRECT LATENCY IN SECS.       0.7 AVG.     0.22 S.D.


TRANSCRIBE FROM SPOKEN RUSSIAN               11 ITEMS
             AVERAGE PER CENT CORRECT      94.4
             CORRECT LATENCY IN SECS.       0.7 AVG.     0.20 S.D.


TRANSFORM FROM TELETYPE RUSSIAN               8 ITEMS
             AVERAGE PER CENT CORRECT      87.5
             CORRECT LATENCY IN SECS.       0.8 AVG.     0.23 S.D.


TRANSFORM FROM SPOKEN RUSSIAN                 0 ITEMS




INFLECT TELETYPE RUSSIAN                     76 ITEMS
             AVERAGE PER CENT CORRECT      82.5
             CORRECT LATENCY IN SECS.       2.2 AVG.     1.16 S.D.


OTHER ITEM TYPES                              6 ITEMS
             AVERAGE PER CENT CORRECT      94.9
             CORRECT LATENCY IN SECS.       1.9 AVG.     0.54 S.D.
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              LESSON  74    DATA FOR  27  STUDENTS

ALL ITEM TYPES                                  131 ITEMS
              AVERAGE PER CENT CORRECT         83.6
              CORRECT LATENCY IN SECS.          1.8 AVG.     1.40 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                    4 ITEMS
              AVERAGE PER CENT CORRECT         88.9
              CORRECT LATENCY IN SECS.          0.8 AVG.     0.32 S.D.

TRANSLATE FROM TELETYPE ENGLISH                  14 ITEMS
              AVERAGE PER CENT CORRECT         90.5
              CORRECT LATENCY IN SECS.          0.7 AVG.     0.20 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                   13 ITEMS
              AVERAGE PER CENT CORRECT         96.3
              CORRECT LATENCY IN SECS.          0.6 AVG.     0.11 S.D.

TRANSFORM FROM TELETYPE RUSSIAN                  24 ITEMS
              AVERAGE PER CENT CORRECT         70.4
              CORRECT LATENCY IN SECS.          0.9 AVG.     0.18 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                     0 ITEMS



INFLECT TELETYPE RUSSIAN                         66 ITEMS
              AVERAGE PER CENT CORRECT         82.6
              CORRECT LATENCY IN SECS.          2.6 AVG.     1.48 S.D.

OTHER ITEM TYPES                                 10 ITEMS
              AVERAGE PER CENT CORRECT         93.3
              CORRECT LATENCY IN SECS.          1.5 AVG.     0.58 S.D.
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          LESSON  75    DATA FOR  24  STUDENTS

ALL ITEM TYPES                          123 ITEMS
          AVERAGE PER CENT CORRECT     81.9
          CORRECT LATENCY IN SECS.      1.2 AVG.    0.93 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN           18 ITEMS
          AVERAGE PER CENT CORRECT     64.1
          CORRECT LATENCY IN SECS.      0.8 AVG.    0.30 S.D.

TRANSLATE FROM TELETYPE ENGLISH          40 ITEMS
          AVERAGE PER CENT CORRECT     87.6
          CORRECT LATENCY IN SECS.      0.7 AVG.    0.95 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN            9 ITEMS
          AVERAGE PER CENT CORRECT     90.7
          CORRECT LATENCY IN SECS.      0.6 AVG.    0.07 S.D.

TRANSFORM FROM TELETYPE RUSSIAN           0 ITEMS



TRANSFORM FROM SPOKEN RUSSIAN             0 ITEMS



INFLECT TELETYPE RUSSIAN                 37 ITEMS
          AVERAGE PER CENT CORRECT     77.7
          CORRECT LATENCY IN SECS.      1.8 AVG.    1.17 S.D.

OTHER ITEM TYPES                         19 ITEMS
          AVERAGE PER CENT CORRECT     90.8
          CORRECT LATENCY IN SECS.      1.9 AVG.    0.95 S.D.
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            LESSON  76    DATA FOR  21  STUDENTS

ALL ITEM TYPES                              118 ITEMS
            AVERAGE PER CENT CORRECT       83.7
            CORRECT LATENCY IN SECS.        1.2 AVG.     0.71 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN               20 ITEMS
            AVERAGE PER CENT CORRECT       75.5
            CORRECT LATENCY IN SECS.        0.9 AVG.     0.23 S.D.

TRANSLATE FROM TELETYPE ENGLISH              13 ITEMS
            AVERAGE PER CENT CORRECT       87.2
            CORRECT LATENCY IN SECS.        0.8 AVG.     0.51 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                9 ITEMS
            AVERAGE PER CENT CORRECT       93.1
            CORRECT LATENCY IN SECS.        0.7 AVG.     0.17 S.D.

TRANSFORM FROM TELETYPE RUSSIAN              43 ITEMS
            AVERAGE PER CENT CORRECT       80.8
            CORRECT LATENCY IN SECS.        1.0 AVG.     0.41 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                 0 ITEMS



INFLECT TELETYPE RUSSIAN                     25 ITEMS
            AVERAGE PER CENT CORRECT       86.8
            CORRECT LATENCY IN SECS.        1.6 AVG.     0.38 S.D.

OTHER ITEM TYPES                              8 ITEMS
            AVERAGE PER CENT CORRECT       92.9
            CORRECT LATENCY IN SECS.        2.1 AVG.     0.96 S.D.
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                LESSON  77    DATA FOR  24  STUDENTS

ALL ITEM TYPES                                    122 ITEMS
                AVERAGE PER CENT CORRECT         86.3
                CORRECT LATENCY IN SECS.          1.0 AVG.     0.77 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                     14 ITEMS
                AVERAGE PER CENT CORRECT         79.2
                CORRECT LATENCY IN SECS.          0.7 AVG.     0.19 S.D.

TRANSLATE FROM TELETYPE ENGLISH                    34 ITEMS
                AVERAGE PER CENT CORRECT         84.2
                CORRECT LATENCY IN SECS.          0.7 AVG.     0.39 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                     14 ITEMS
                AVERAGE PER CENT CORRECT         91.1
                CORRECT LATENCY IN SECS.          0.6 AVG.     0.08 S.D.

TRANSFORM FROM TELETYPE RUSSIAN                    12 ITEMS
                AVERAGE PER CENT CORRECT         84.0
                CORRECT LATENCY IN SECS.          0.9 AVG.     0.26 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                       0 ITEMS



INFLECT TELETYPE RUSSIAN                           21 ITEMS
                AVERAGE PER CENT CORRECT         94.6
                CORRECT LATENCY IN SECS.          1.3 AVG.     0.87 S.D.

OTHER ITEM TYPES                                   27 ITEMS
                AVERAGE PER CENT CORRECT         84.7
                CORRECT LATENCY IN SECS.          1.8 AVG.     0.89 S.D.
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                 LESSON  79    DATA FOR  23  STUDENTS

ALL ITEM TYPES                                   143 ITEMS
             AVERAGE PER CENT CORRECT          82.7
             CORRECT LATENCY IN SECS.           1.9 AVG.      1.77 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                     3 ITEMS
             AVERAGE PER CENT CORRECT          98.0
             CORRECT LATENCY IN SECS.           0.7 AVG.      0.76 S.D.

TRANSLATE FROM TELETYPE ENGLISH                   19 ITEMS
             AVERAGE PER CENT CORRECT          73.3
             CORRECT LATENCY IN SECS.           0.7 AVG.      0.31 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                    10 ITEMS
             AVERAGE PER CENT CORRECT          93.7
             CORRECT LATENCY IN SECS.           0.7 AVG.      0.23 S.D.

TRANSFORM FROM TELETYPE RUSSIAN                    9 ITEMS
             AVERAGE PER CENT CORRECT          67.3
             CORRECT LATENCY IN SECS.           0.6 AVG.      0.26 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                      0 ITEMS



INFLECT TELETYPE RUSSIAN                          96 ITEMS
             AVERAGE PER CENT CORRECT          87.6
             CORRECT LATENCY IN SECS.           2.3 AVG.      1.17 S.D.

OTHER ITEM TYPES                                   6 ITEMS
             AVERAGE PER CENT CORRECT          90.6
             CORRECT LATENCY IN SECS.           1.8 AVG.      0.38 S.D.
             LESSON  80    DATA FOR  22  STUDENTS

ALL ITEM TYPES                              125 ITEMS
             AVERAGE PER CENT CORRECT      79.0
             CORRECT LATENCY IN SECS.       1.4 AVG.      1.15 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN               12 ITEMS
             AVERAGE PER CENT CORRECT      71.2
             CORRECT LATENCY IN SECS.       0.9 AVG.      0.27 S.D.

TRANSLATE FROM TELETYPE ENGLISH              27 ITEMS
             AVERAGE PER CENT CORRECT      72.4
             CORRECT LATENCY IN SECS.       0.7 AVG.      0.38 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN               14 ITEMS
             AVERAGE PER CENT CORRECT      89.3
             CORRECT LATENCY IN SECS.       0.8 AVG.      0.27 S.D.

TRANSFORM FROM TELETYPE RUSSIAN              13 ITEMS
             AVERAGE PER CENT CORRECT      65.7
             CORRECT LATENCY IN SECS.       0.6 AVG.      0.31 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                 0 ITEMS



INFLECT TELETYPE RUSSIAN                     38 ITEMS
             AVERAGE PER CENT CORRECT      83.6
             CORRECT LATENCY IN SECS.       2.0 AVG.      1.30 S.D.

OTHER ITEM TYPES                             21 ITEMS
             AVERAGE PER CENT CORRECT      84.9
             CORRECT LATENCY IN SECS.       2.6 AVG.      0.96 S.D.
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          LESSON  81    DATA FOR  18  STUDENTS

ALL ITEM TYPES                          153 ITEMS
          AVERAGE PER CENT CORRECT     84.0
          CORRECT LATENCY IN SECS.      1.4 AVG.     0.81 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN            0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH          21 ITEMS
          AVERAGE PER CENT CORRECT     75.7
          CORRECT LATENCY IN SECS.      0.7 AVG.     0.35 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN            0 ITEMS



TRANSFORM FROM TELETYPE RUSSIAN           8 ITEMS
          AVERAGE PER CENT CORRECT     88.9
          CORRECT LATENCY IN SECS.      0.8 AVG.     0.28 S.D.

TRANSFORM FROM SPOKEN RUSSIAN             9 ITEMS
          AVERAGE PER CENT CORRECT     80.9
          CORRECT LATENCY IN SECS.      0.9 AVG.     0.19 S.D.

INFLECT TELETYPE RUSSIAN                101 ITEMS
          AVERAGE PER CENT CORRECT     84.8
          CORRECT LATENCY IN SECS.      1.7 AVG.     0.81 S.D.

OTHER ITEM TYPES                         14 ITEMS
          AVERAGE PER CENT CORRECT     90.5
          CORRECT LATENCY IN SECS.      1.7 AVG.     0.75 S.D.
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            LESSON  82    DATA FOR  26  STUDENTS

ALL ITEM TYPES                         117 ITEMS
            AVERAGE PER CENT CORRECT  81.3
            CORRECT LATENCY IN SECS.   1.3 AVG.     0.93 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN           2 ITEMS
            AVERAGE PER CENT CORRECT  69.3
            CORRECT LATENCY IN SECS.   0.7 AVG.     0.07 S.D.

TRANSLATE FROM TELETYPE ENGLISH         47 ITEMS
            AVERAGE PER CENT CORRECT  79.1
            CORRECT LATENCY IN SECS.   0.8 AVG.     0.33 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN           0 ITEMS



TRANSFORM FROM TELETYPE RUSSIAN          6 ITEMS
            AVERAGE PER CENT CORRECT  66.7
            CORRECT LATENCY IN SECS.   0.8 AVG.     0.29 S.D.

TRANSFORM FROM SPOKEN RUSSIAN            0 ITEMS



INFLECT TELETYPE RUSSIAN                59 ITEMS
            AVERAGE PER CENT CORRECT  85.7
            CORRECT LATENCY IN SECS.   1.7 AVG.     0.90 S.D.

OTHER ITEM TYPES                         3 ITEMS
            AVERAGE PER CENT CORRECT  68.0
            CORRECT LATENCY IN SECS.   4.0 AVG.     1.31 S.D.
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          LESSON  83    DATA FOR  22  STUDENTS

ALL ITEM TYPES                          119 ITEMS
          AVERAGE PER CENT CORRECT    78.6
          CORRECT LATENCY IN SECS.     1.4 AVG.     1.00 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN            0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH          32 ITEMS
          AVERAGE PER CENT CORRECT    79.8
          CORRECT LATENCY IN SECS.     0.8 AVG.     0.23 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN            0 ITEMS



TRANSFORM FROM TELETYPE RUSSIAN          27 ITEMS
          AVERAGE PER CENT CORRECT    74.4
          CORRECT LATENCY IN SECS.     0.9 AVG.     0.19 S.D.

TRANSFORM FROM SPOKEN RUSSIAN             8 ITEMS
          AVERAGE PER CENT CORRECT    70.5
          CORRECT LATENCY IN SECS.     1.0 AVG.     0.29 S.D.

INFLECT TELETYPE RUSSIAN                 33 ITEMS
          AVERAGE PER CENT CORRECT    83.6
          CORRECT LATENCY IN SECS.     1.6 AVG.     0.83 S.D.

OTHER ITEM TYPES                         19 ITEMS
          AVERAGE PER CENT CORRECT    77.0
          CORRECT LATENCY IN SECS.     3.0 AVG.     1.19 S.D.
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            LESSON  85    DATA FOR  15  STUDENTS

ALL ITEM TYPES                             175 ITEMS
           AVERAGE PER CENT CORRECT       85.6
           CORRECT LATENCY IN SECS.        1.5 AVG.     1.08 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN               0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH             45 ITEMS
           AVERAGE PER CENT CORRECT       82.1
           CORRECT LATENCY IN SECS.        0.7 AVG.     0.27 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN               0 ITEMS



TRANSFORM FROM TELETYPE RUSSIAN              2 ITEMS
           AVERAGE PER CENT CORRECT       90.0
           CORRECT LATENCY IN SECS.        0.6 AVG.     0.14 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                9 ITEMS
           AVERAGE PER CENT CORRECT       74.8
           CORRECT LATENCY IN SECS.        0.9 AVG.     0.39 S.D.

INFLECT TELETYPE RUSSIAN                   108 ITEMS
           AVERAGE PER CENT CORRECT       87.4
           CORRECT LATENCY IN SECS.        1.8 AVG.     1.11 S.D.

OTHER ITEM TYPES                            11 ITEMS
           AVERAGE PER CENT CORRECT       90.3
           CORRECT LATENCY IN SECS.        2.2 AVG.     1.15 S.D.
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          LESSON  86    DATA FOR  22  STUDENTS

ALL ITEM TYPES                           121 ITEMS
          AVERAGE PER CENT CORRECT      87.4
          CORRECT LATENCY IN SECS.       1.3 AVG.     1.15 S.D.


TYPE ANSWERS TO SPOKEN RUSSIAN             7 ITEMS
          AVERAGE PER CENT CORRECT      85.7
          CORRECT LATENCY IN SECS.       0.7 AVG.     0.14 S.D.


TRANSLATE FROM TELETYPE ENGLISH           24 ITEMS
          AVERAGE PER CENT CORRECT      82.2
          CORRECT LATENCY IN SECS.       0.5 AVG.     0.22 S.D.


TRANSCRIBE FROM SPOKEN RUSSIAN            22 ITEMS
          AVERAGE PER CENT CORRECT      93.6
          CORRECT LATENCY IN SECS.       0.6 AVG.     0.14 S.D.


TRANSFORM FROM TELETYPE RUSSIAN           12 ITEMS
          AVERAGE PER CENT CORRECT      81.1
          CORRECT LATENCY IN SECS.       0.6 AVG.     0.12 S.D.


TRANSFORM FROM SPOKEN RUSSIAN              1 ITEMS
          AVERAGE PER CENT CORRECT      90.9
          CORRECT LATENCY IN SECS.       0.7 AVG.     0.00 S.D.


INFLECT TELETYPE RUSSIAN                  48 ITEMS
          AVERAGE PER CENT CORRECT      87.7
          CORRECT LATENCY IN SECS.       2.3 AVG.     1.94 S.D.


OTHER ITEM TYPES                           7 ITEMS
          AVERAGE PER CENT CORRECT      95.5
          CORRECT LATENCY IN SECS.       1.9 AVG.     0.75 S.D.
          LESSON  #7    DATA FOR  25  STUDENTS

ALL ITEM TYPES                          109 ITEMS
          AVERAGE PER CENT CORRECT     87.6
          CORRECT LATENCY IN SECS.      1.4 AVG.    0.98 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN            0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH          20 ITEMS
          AVERAGE PER CENT CORRECT     82.8
          CORRECT LATENCY IN SECS.      0.8 AVG.    0.22 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN           30 ITEMS
          AVERAGE PER CENT CORRECT     92.8
          CORRECT LATENCY IN SECS.      0.6 AVG.    0.17 S.D.

TRANSFORM FROM TELETYPE RUSSIAN           2 ITEMS
          AVERAGE PER CENT CORRECT     84.0
          CORRECT LATENCY IN SECS.      0.7 AVG.    0.00 S.D.

TRANSFORM FROM SPOKEN RUSSIAN             0 ITEMS



INFLECT TELETYPE RUSSIAN                 52 ITEMS
          AVERAGE PER CENT CORRECT     85.8
          CORRECT LATENCY IN SECS.      2.1 AVG.    0.96 S.D.

OTHER ITEM TYPES                          5 ITEMS
          AVERAGE PER CENT CORRECT     96.0
          CORRECT LATENCY IN SECS.      1.6 AVG.    0.61 S.D.
          LESSON  88    DATA FOR  26  STUDENTS

ALL ITEM TYPES                           231 ITEMS
          AVERAGE PER CENT CORRECT      72.7
          CORRECT LATENCY IN SECS.       1.7 AVG.     1.05 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN             0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH           62 ITEMS
          AVERAGE PER CENT CORRECT      69.2
          CORRECT LATENCY IN SECS.       0.8 AVG.     0.99 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN             0 ITEMS



TRANSFORM FROM TELETYPE RUSSIAN            2 ITEMS
          AVERAGE PER CENT CORRECT      53.9
          CORRECT LATENCY IN SECS.       1.2 AVG.     0.42 S.D.

TRANSFORM FROM SPOKEN RUSSIAN              0 ITEMS



INFLECT TELETYPE RUSSIAN                 136 ITEMS
          AVERAGE PER CENT CORRECT      76.3
          CORRECT LATENCY IN SECS.       1.8 AVG.     1.04 S.D.

OTHER ITEM TYPES                          31 ITEMS
          AVERAGE PER CENT CORRECT      64.9
          CORRECT LATENCY IN SECS.       2.8 AVG.     0.86 S.D.
          LESSON  63    DATA FOR  22  STUDENTS

ALL ITEM TYPES                              230 ITEMS
          AVERAGE PER CENT CORRECT    60.1
          CORRECT LATENCY IN SECS.     1.5 AVG.     0.94 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH              84 ITEMS
          AVERAGE PER CENT CORRECT    79.4
          CORRECT LATENCY IN SECS.     0.8 AVG.     0.28 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                0 ITEMS



TRANSFORM FROM TELETYPE RUSSIAN               2 ITEMS
          AVERAGE PER CENT CORRECT    56.9
          CORRECT LATENCY IN SECS.     1.0 AVG.     0.28 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                 0 ITEMS



INFLECT TELETYPE RUSSIAN                    135 ITEMS
          AVERAGE PER CENT CORRECT    41.5
          CORRECT LATENCY IN SECS.     1.9 AVG.     0.94 S.D.

OTHER ITEM TYPES                              9 ITEMS
          AVERAGE PER CENT CORRECT    69.7
          CORRECT LATENCY IN SECS.     2.4 AVG.     0.90 S.D.
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              LESSON  90    DATA FOR  24  STUDENTS

ALL ITEM TYPES                               229 ITEMS
              AVERAGE PER CENT CORRECT    82.3
              CORRECT LATENCY IN SECS.      1.4 AVG.     0.97 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                 0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH              108 ITEMS
              AVERAGE PER CENT CORRECT    83.4
              CORRECT LATENCY IN SECS.      0.8 AVG.     0.20 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                 0 ITEMS



TRANSFORM FROM TELETYPE RUSSIAN                0 ITEMS



TRANSFORM FROM SPOKEN RUSSIAN                  0 ITEMS



INFLECT TELETYPE RUSSIAN                     108 ITEMS
              AVERAGE PER CENT CORRECT    83.2
              CORRECT LATENCY IN SECS.      1.6 AVG.     0.97 S.D.

OTHER ITEM TYPES                              13 ITEMS
              AVERAGE PER CENT CORRECT    79.3
              CORRECT LATENCY IN SECS.      2.3 AVG.     0.79 S.D.
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         LESSON  91    DATA FOR  18  STUDENTS

ALL ITEM TYPES                           335 ITEMS
         AVERAGE PER CENT CORRECT       90.0
         CORRECT LATENCY IN SECS.        1.6 AVG.     0.76 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN             0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH           19 ITEMS
         AVERAGE PER CENT CORRECT       75.7
         CORRECT LATENCY IN SECS.        0.6 AVG.     0.19 S.D

TRANSCRIBE FROM SPOKEN RUSSIAN             0 ITEMS



TRANSFORM FROM TELETYPE RUSSIAN            0 ITEMS



TRANSFORM FROM SPOKEN RUSSIAN              0 ITEMS



INFLECT TELETYPE RUSSIAN                 316 ITEMS
         AVERAGE PER CENT CORRECT       90.9
         CORRECT LATENCY IN SECS.        1.6 AVG.     0.75 S.

OTHER ITEM TYPES                           0 ITEMS
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Appendix 6

Third Quarter Lesson Summary Analysis

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      LESSONS  93 TO 135

ALL ITEM TYPES                              2582 ITEMS
          AVERAGE PER CENT CORRECT      81.9
          CORRECT LATENCY IN SECS.       1.2 AVG.     1.07 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                 0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH          740 ITEMS
          AVERAGE PER CENT CORRECT      77.4
          CORRECT LATENCY IN SECS.       0.7 AVG.     0.24 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN           197 ITEMS
          AVERAGE PER CENT CORRECT      94.2
          CORRECT LATENCY IN SECS.       0.6 AVG.     0.22 S.D.

TRANSFORM FROM TELETYPE RUSSIAN          314 ITEMS
          AVERAGE PER CENT CORRECT      78.5
          CORRECT LATENCY IN SECS.       0.9 AVG.     0.32 S.D.

TRANSFORM FROM SPOKEN RUSSIAN             16 ITEMS
          AVERAGE PER CENT CORRECT      69.0
          CORRECT LATENCY IN SECS.       1.0 AVG.     0.26 S.D.

INFLECT TELETYPE RUSSIAN                    1097 ITEMS
          AVERAGE PER CENT CORRECT      82.8
          CORRECT LATENCY IN SECS.       1.5 AVG.     0.89 S.D.

OTHER ITEM TYPES                         218 ITEMS
          AVERAGE PER CENT CORRECT      87.2
          CORRECT LATENCY IN SECS.       2.2 AVG.     2.49 S.D.
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              LESSON  93    DATA FOR  22  STUDENTS

ALL ITEM TYPES                             126 ITEMS
              AVERAGE PER CENT CORRECT    91.0
              CORRECT LATENCY IN SECS.     1.4 AVG.      0.97 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN               0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH             26 ITEMS
              AVERAGE PER CENT CORRECT    86.9
              CORRECT LATENCY IN SECS.     0.6 AVG.      0.17 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN              18 ITEMS
              AVERAGE PER CENT CORRECT    95.7
              CORRECT LATENCY IN SECS.     0.7 AVG.      0.35 S.D.

TRANSFORM FROM TELETYPE RUSSIAN              7 ITEMS
              AVERAGE PER CENT CORRECT    83.1
              CORRECT LATENCY IN SECS.     1.3 AVG.      0.22 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                0 ITEMS



INFLECT TELETYPE RUSSIAN                    69 ITEMS
              AVERAGE PER CENT CORRECT    92.0
              CORRECT LATENCY IN SECS.     1.8 AVG.      1.00 S.D.

OTHER ITEM TYPES                             6 ITEMS
              AVERAGE PER CENT CORRECT    92.4
              CORRECT LATENCY IN SECS.     1.9 AVG.      1.01 S.D.
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            LESSON 100    DATA FOR  23  STUDENTS

ALL ITEM TYPES                              135 ITEMS
            AVERAGE PER CENT CORRECT       83.6
            CORRECT LATENCY IN SECS.        1.5 AVG.     1.19 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                0 ITEMS




TRANSLATE FROM TELETYPE ENGLISH              33 ITEMS
            AVERAGE PER CENT CORRECT       80.8
            CORRECT LATENCY IN SECS.        0.6 AVG.     0.19 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN               13 ITEMS
            AVERAGE PER CENT CORRECT       96.7
            CORRECT LATENCY IN SECS.        0.6 AVG.     0.13 S.D.

TRANSFORM FROM TELETYPE RUSSIAN              16 ITEMS
            AVERAGE PER CENT CORRECT       77.5
            CORRECT LATENCY IN SECS.        1.0 AVG.     0.24 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                 0 ITEMS




INFLECT TELETYPE RUSSIAN                     61 ITEMS
            AVERAGE PER CENT CORRECT       81.6
            CORRECT LATENCY IN SECS.        2.1 AVG.     1.32 S.D.

OTHER ITEM TYPES                             12 ITEMS
            AVERAGE PER CENT CORRECT       95.3
            CORRECT LATENCY IN SECS.        2.1 AVG.     1.07 S.D.
            LESSON 102    DATA FOR  24  STUDENTS

ALL ITEM TYPES                             129 ITEMS
            AVERAGE PER CENT CORRECT      85.5
            CORRECT LATENCY IN SECS.       1.5 AVG.     0.95 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN               0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH             23 ITEMS
            AVERAGE PER CENT CORRECT      76.3
            CORRECT LATENCY IN SECS.       0.8 AVG.     0.36 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN              16 ITEMS
            AVERAGE PER CENT CORRECT      93.2
            CORRECT LATENCY IN SECS.       0.6 AVG.     0.29 S.D.

TRANSFORM FROM TELETYPE RUSSIAN              7 ITEMS
            AVERAGE PER CENT CORRECT      78.0
            CORRECT LATENCY IN SECS.       0.8 AVG.     0.32 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                0 ITEMS



INFLECT TELETYPE RUSSIAN                    69 ITEMS
            AVERAGE PER CENT CORRECT      86.0
            CORRECT LATENCY IN SECS.       1.8 AVG.     0.95 S.D.

OTHER ITEM TYPES                            14 ITEMS
            AVERAGE PER CENT CORRECT      92.6
            CORRECT LATENCY IN SECS.       2.3 AVG.     0.73 S.D.
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          LESSON 104    DATA FOR  24  STUDENTS

ALL ITEM TYPES                            144 ITEMS
          AVERAGE PER CENT CORRECT       84.5
          CORRECT LATENCY IN SECS.        1.3 AVG.     0.88 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN              0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH            49 ITEMS
          AVERAGE PER CENT CORRECT       85.6
          CORRECT LATENCY IN SECS.        0.7 AVG.     0.24 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN              7 ITEMS
          AVERAGE PER CENT CORRECT       97.6
          CORRECT LATENCY IN SECS.        0.7 AVG.     0.34 S.D.

TRANSFORM FROM TELETYPE RUSSIAN             8 ITEMS
          AVERAGE PER CENT CORRECT       77.6
          CORRECT LATENCY IN SECS.        1.1 AVG.     0.19 S.D.

TRANSFORM FROM SPOKEN RUSSIAN               0 ITEMS



INFLECT TELETYPE RUSSIAN                   68 ITEMS
          AVERAGE PER CENT CORRECT       82.0
          CORRECT LATENCY IN SECS.        1.6 AVG.     0.87 S.D.

OTHER ITEM TYPES                           12 ITEMS
          AVERAGE PER CENT CORRECT       90.3
          CORRECT LATENCY IN SECS.        2.5 AVG.     1.01 S.D.
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                    LESSON 106    DATA FOR  23  STUDENTS

ALL ITEM TYPES                                111 ITEMS
          AVERAGE PER CENT CORRECT           80.0
          CORRECT LATENCY IN SECS.            1.3 AVG.     1.04 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                  0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH                35 ITEMS
          AVERAGE PER CENT CORRECT           74.8
          CORRECT LATENCY IN SECS.            0.7 AVG.     0.30 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                 14 ITEMS
          AVERAGE PER CENT CORRECT           96.0
          CORRECT LATENCY IN SECS.            0.5 AVG.     0.07 S.D.

TRANSFORM FROM TELETYPE RUSSIAN                 3 ITEMS
          AVERAGE PER CENT CORRECT           84.1
          CORRECT LATENCY IN SECS.            0.8 AVG.     0.32 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                   0 ITEMS



INFLECT TELETYPE RUSSIAN                       38 ITEMS
          AVERAGE PER CENT CORRECT           80.2
          CORRECT LATENCY IN SECS.            1.5 AVG.     0.66 S.D.

OTHER ITEM TYPES                               21 ITEMS
          AVERAGE PER CENT CORRECT           77.0
          CORRECT LATENCY IN SECS.            2.7 AVG.     1.33 S.D.
          LESSON 108    DATA FOR  24  STUDENTS

ALL ITEM TYPES                              151 ITEMS
          AVERAGE PER CENT CORRECT         84.7
          CORRECT LATENCY IN SECS.          1.3 AVG.    0.96 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH              35 ITEMS
          AVERAGE PER CENT CORRECT         80.0
          CORRECT LATENCY IN SECS.          0.7 AVG.    0.29 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN               23 ITEMS
          AVERAGE PER CENT CORRECT         94.9
          CORRECT LATENCY IN SECS.          0.5 AVG.    0.13 S.D.

TRANSFORM FROM TELETYPE RUSSIAN               7 ITEMS
          AVERAGE PER CENT CORRECT         88.1
          CORRECT LATENCY IN SECS.          0.9 AVG.    0.29 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                 0 ITEMS



INFLECT TELETYPE RUSSIAN                     68 ITEMS
          AVERAGE PER CENT CORRECT         82.6
          CORRECT LATENCY IN SECS.          1.6 AVG.    0.85 S.D.

OTHER ITEM TYPES                             18 ITEMS
          AVERAGE PER CENT CORRECT         87.3
          CORRECT LATENCY IN SECS.          2.2 AVG.    1.48 S.D.
          LESSON 110    DATA FOR  24  STUDENTS

ALL ITEM TYPES                              135 ITEMS
          AVERAGE PER CENT CORRECT         87.3
          CORRECT LATENCY IN SECS.          1.6 AVG.      1.00 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH              31 ITEMS
          AVERAGE PER CENT CORRECT         78.1
          CORRECT LATENCY IN SECS.          0.8 AVG.      0.37 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN               12 ITEMS
          AVERAGE PER CENT CORRECT         91.7
          CORRECT LATENCY IN SECS.          0.8 AVG.      0.34 S.D.

TRANSFORM FROM TELETYPE RUSSIAN               5 ITEMS
          AVERAGE PER CENT CORRECT         94.2
          CORRECT LATENCY IN SECS.          1.1 AVG.      0.43 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                 0 ITEMS



INFLECT TELETYPE RUSSIAN                     66 ITEMS
          AVERAGE PER CENT CORRECT         88.7
          CORRECT LATENCY IN SECS.          1.9 AVG.      0.97 S.D.

OTHER ITEM TYPES                             21 ITEMS
          AVERAGE PER CENT CORRECT         92.5
          CORRECT LATENCY IN SECS.          2.3 AVG.      0.97 S.D.
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              LESSON 114    DATA FOR  24  STUDENTS

ALL ITEM TYPES                             131 ITEMS
              AVERAGE PER CENT CORRECT    81.4
              CORRECT LATENCY IN SECS.     1.3 AVG.     0.95 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN               0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH             52 ITEMS
              AVERAGE PER CENT CORRECT    74.2
              CORRECT LATENCY IN SECS.     0.8 AVG.     0.27 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN              10 ITEMS
              AVERAGE PER CENT CORRECT    96.2
              CORRECT LATENCY IN SECS.     0.7 AVG.     0.12 S.D.

TRANSFORM FROM TELETYPE RUSSIAN              9 ITEMS
              AVERAGE PER CENT CORRECT    90.3
              CORRECT LATENCY IN SECS.     1.2 AVG.     0.32 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                5 ITEMS
              AVERAGE PER CENT CORRECT    65.8
              CORRECT LATENCY IN SECS.     1.1 AVG.     0.23 S.D.

INFLECT TELETYPE RUSSIAN                    53 ITEMS
              AVERAGE PER CENT CORRECT    85.6
              CORRECT LATENCY IN SECS.     2.0 AVG.     1.18 S.D.

OTHER ITEM TYPES                             2 ITEMS
              AVERAGE PER CENT CORRECT    81.3
              CORRECT LATENCY IN SECS.     1.4 AVG.     0.99 S.D.
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               LESSON 116    DATA FOR  23  STUDENTS

ALL ITEM TYPES                                  120 ITEMS
               AVERAGE PER CENT CORRECT       76.5
               CORRECT LATENCY IN SECS.         1.1 AVG.      2.09 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                    0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH                  39 ITEMS
               AVERAGE PER CENT CORRECT       74.5
               CORRECT LATENCY IN SECS.         0.7 AVG.      0.20 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                   17 ITEMS
               AVERAGE PER CENT CORRECT       67.8
               CORRECT LATENCY IN SECS.         0.7 AVG.      0.20 S.D.

TRANSFORM FROM TELETYPE RUSSIAN                  18 ITEMS
               AVERAGE PER CENT CORRECT       79.2
               CORRECT LATENCY IN SECS.         1.1 AVG.      0.33 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                    11 ITEMS
               AVERAGE PER CENT CORRECT       70.4
               CORRECT LATENCY IN SECS.         0.9 AVG.      0.27 S.D.

INFLECT TELETYPE RUSSIAN                         31 ITEMS
               AVERAGE PER CENT CORRECT       81.8
               CORRECT LATENCY IN SECS.         1.3 AVG.      0.44 S.D.

OTHER ITEM TYPES                                  4 ITEMS
               AVERAGE PER CENT CORRECT       71.9
               CORRECT LATENCY IN SECS.         7.6 AVG.     10.31 S.D.
               LESSON 116    DATA FOR  24  STUDENTS

ALL ITEM TYPES                                  116 ITEMS
               AVERAGE PER CENT CORRECT     66.6
               CORRECT LATENCY IN SECS.      0.9 AVG.    0.73 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                    0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH                  46 ITEMS
               AVERAGE PER CENT CORRECT     67.7
               CORRECT LATENCY IN SECS.      0.7 AVG.    0.24 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                   20 ITEMS
               AVERAGE PER CENT CORRECT     95.2
               CORRECT LATENCY IN SECS.      0.6 AVG.    0.19 S.D.

TRANSFORM FROM TELETYPE RUSSIAN                   9 ITEMS
               AVERAGE PER CENT CORRECT     66.3
               CORRECT LATENCY IN SECS.      0.9 AVG.    0.23 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                     0 ITEMS



INFLECT TELETYPE RUSSIAN                         34 ITEMS
               AVERAGE PER CENT CORRECT     43.2
               CORRECT LATENCY IN SECS.      1.2 AVG.    0.48 S.D.

OTHER ITEM TYPES                                  6 ITEMS
               AVERAGE PER CENT CORRECT     68.3
               CORRECT LATENCY IN SECS.      2.4 AVG.    1.97 S.D.
```

```
              LESSON 120    DATA FOR  17  STUDENTS

ALL ITEM TYPES                              136 ITEMS
            AVERAGE PER CENT CORRECT       86.8
            CORRECT LATENCY IN SECS.        0.9 AVG.     0.77 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH              51 ITEMS
            AVERAGE PER CENT CORRECT       78.2
            CORRECT LATENCY IN SECS.        0.5 AVG.     0.20 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN               17 ITEMS
            AVERAGE PER CENT CORRECT       93.4
            CORRECT LATENCY IN SECS.        0.6 AVG.     0.18 S.D.

TRANSFORM FROM TELETYPE RUSSIAN               0 ITEMS



TRANSFORM FROM SPOKEN RUSSIAN                 0 ITEMS



INFLECT TELETYPE RUSSIAN                     57 ITEMS
            AVERAGE PER CENT CORRECT       90.6
            CORRECT LATENCY IN SECS.        1.2 AVG.     0.87 S.D.

OTHER ITEM TYPES                             11 ITEMS
            AVERAGE PER CENT CORRECT       96.3
            CORRECT LATENCY IN SECS.        1.7 AVG.     1.20 S.D.
```

```
                 LESSON 122    DATA FOR  24  STUDENTS

ALL ITEM TYPES                                  129 ITEMS
             AVERAGE PER CENT CORRECT          82.7
             CORRECT LATENCY IN SECS.           1.2 AVG.     1.04 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                    0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH                  42 ITEMS
             AVERAGE PER CENT CORRECT          79.7
             CORRECT LATENCY IN SECS.           0.6 AVG.     0.18 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                   14 ITEMS
             AVERAGE PER CENT CORRECT          94.0
             CORRECT LATENCY IN SECS.           0.6 AVG.     0.13 S.D.

TRANSFORM FROM TELETYPE RUSSIAN                   0 ITEMS



TRANSFORM FROM SPOKEN RUSSIAN                     0 ITEMS



INFLECT TELETYPE RUSSIAN                         63 ITEMS
             AVERAGE PER CENT CORRECT          82.0
             CORRECT LATENCY IN SECS.           1.5 AVG.     0.91 S.D.

OTHER ITEM TYPES                                 10 ITEMS
             AVERAGE PER CENT CORRECT          83.3
             CORRECT LATENCY IN SECS.           2.9 AVG.     1.88 S.D.
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          LESSON 124    DATA FOR  20  STUDENTS

ALL ITEM TYPES                         129 ITEMS
          AVERAGE PER CENT CORRECT    78.2
          CORRECT LATENCY IN SECS.     1.2 AVG.    1.79 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN           0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH         30 ITEMS
          AVERAGE PER CENT CORRECT    72.8
          CORRECT LATENCY IN SECS.     0.6 AVG.    0.26 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN          12 ITEMS
          AVERAGE PER CENT CORRECT    95.4
          CORRECT LATENCY IN SECS.     0.5 AVG.    0.07 S.D.

TRANSFORM FROM TELETYPE RUSSIAN         13 ITEMS
          AVERAGE PER CENT CORRECT    64.2
          CORRECT LATENCY IN SECS.     0.9 AVG.    0.34 S.D.

TRANSFORM FROM SPOKEN RUSSIAN            0 ITEMS



INFLECT TELETYPE RUSSIAN                65 ITEMS
          AVERAGE PER CENT CORRECT    81.1
          CORRECT LATENCY IN SECS.     1.3 AVG.    0.64 S.D.

OTHER ITEM TYPES                         9 ITEMS
          AVERAGE PER CENT CORRECT    72.7
          CORRECT LATENCY IN SECS.     3.8 AVG.    6.14 S.D.
```

```
              LESSON 126    DATA FOR  23  STUDENTS

ALL ITEM TYPES                            130 ITEMS
              AVERAGE PER CENT CORRECT   79.0
              CORRECT LATENCY IN SECS.    1.3 AVG.     0.67 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN              0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH            24 ITEMS
              AVERAGE PER CENT CORRECT   69.4
              CORRECT LATENCY IN SECS.    0.6 AVG.     0.17 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN              4 ITEMS
              AVERAGE PER CENT CORRECT   92.4
              CORRECT LATENCY IN SECS.    0.6 AVG.     0.22 S.D.

TRANSFORM FROM TELETYPE RUSSIAN             4 ITEMS
              AVERAGE PER CENT CORRECT   90.3
              CORRECT LATENCY IN SECS.    0.8 AVG.     0.31 S.D.

TRANSFORM FROM SPOKEN RUSSIAN               0 ITEMS



INFLECT TELETYPE RUSSIAN                   82 ITEMS
              AVERAGE PER CENT CORRECT   79.4
              CORRECT LATENCY IN SECS.    1.4 AVG.     0.57 S.D.

OTHER ITEM TYPES                           16 ITEMS
              AVERAGE PER CENT CORRECT   85.3
              CORRECT LATENCY IN SECS.    1.9 AVG.     0.76 S.D.
```

```
          LESSON 128    DATA FOR  22  STUDENTS

ALL ITEM TYPES                          163 ITEMS
          AVERAGE PER CENT CORRECT     72.1
          CORRECT LATENCY IN SECS.      0.9 AVG.     0.61 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN            0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH          93 ITEMS
          AVERAGE PER CENT CORRECT     67.4
          CORRECT LATENCY IN SECS.      0.6 AVG.     0.19 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN            0 ITEMS



TRANSFORM FROM TELETYPE RUSSIAN           3 ITEMS
          AVERAGE PER CENT CORRECT    100.0
          CORRECT LATENCY IN SECS.      0.6 AVG.     0.06 S.D.

TRANSFORM FROM SPOKEN RUSSIAN             0 ITEMS



INFLECT TELETYPE RUSSIAN                 51 ITEMS
          AVERAGE PER CENT CORRECT     72.6
          CORRECT LATENCY IN SECS.      1.3 AVG.     0.79 S.D.

OTHER ITEM TYPES                         16 ITEMS
          AVERAGE PER CENT CORRECT     91.8
          CORRECT LATENCY IN SECS.      1.3 AVG.     0.67 S.D.
```

```
         LESSON 130    DATA FOR  22  STUDENTS

ALL ITEM TYPES                            333 ITEMS
         AVERAGE PER CENT CORRECT        79.1
         CORRECT LATENCY IN SECS.         1.0 AVG.     0.40 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN              0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH             0 ITEMS



TRANSCRIBE FROM SPOKEN RUSSIAN              0 ITEMS



TRANSFORM FROM TELETYPE RUSSIAN           197 ITEMS
         AVERAGE PER CENT CORRECT        77.3
         CORRECT LATENCY IN SECS.         0.9 AVG.     0.32 S.D.

TRANSFORM FROM SPOKEN RUSSIAN               0 ITEMS



INFLECT TELETYPE RUSSIAN                   97 ITEMS
         AVERAGE PER CENT CORRECT        79.3
         CORRECT LATENCY IN SECS.         1.2 AVG.     0.48 S.D.

OTHER ITEM TYPES                           39 ITEMS
         AVERAGE PER CENT CORRECT        88.1
         CORRECT LATENCY IN SECS.         1.0 AVG.     0.36 S.D.
```

```
                LESSON 132    DATA FOR  19  STUDENTS

ALL ITEM TYPES                              264 ITEMS
                AVERAGE PER CENT CORRECT   79.4
                CORRECT LATENCY IN SECS.    0.9 AVG.     1.21 S.D.

TYPE ANSWERS TO SPOKEN RUSSIAN                0 ITEMS



TRANSLATE FROM TELETYPE ENGLISH             134 ITEMS
                AVERAGE PER CENT CORRECT   79.5
                CORRECT LATENCY IN SECS.    0.6 AVG.     0.20 S.D.

TRANSCRIBE FROM SPOKEN RUSSIAN                0 ITEMS



TRANSFORM FROM TELETYPE RUSSIAN               8 ITEMS
                AVERAGE PER CENT CORRECT   73.7
                CORRECT LATENCY IN SECS.    0.7 AVG.     0.22 S.D.

TRANSFORM FROM SPOKEN RUSSIAN                 0 ITEMS



INFLECT TELETYPE RUSSIAN                    121 ITEMS
                AVERAGE PER CENT CORRECT   80.3
                CORRECT LATENCY IN SECS.    1.1 AVG.     0.57 S.D.

OTHER ITEM TYPES                              1 ITEMS
                AVERAGE PER CENT CORRECT    2.0
                CORRECT LATENCY IN SECS.   19.0 AVG.     0.00 S.D.
```

Appendix 7

Results of First-year Russian Examinations

TABLE 1

Results of First-year Russian Autumn Quarter Midterm Examination (Common Portion)

Number of Errors	Computer-based	Regular
1.5	1	
2.5		3
4	2	
4.5		2
5	1	
5.5		3
6	1	
6.5	2	
7.5		3
8	2	
8.5	1	1
9	1	
10	1	4
10.5		2
11	1	
11.5		1
12	1	
12.5	1	
13		1
13.5	1	1
14	1	
15	1	
17	1	
18.5		1
19		1
20	1	
20.5	1	
21	1	
23.5		1
24	1	
24.5	2	
25		1
26.5	1	
30.5	1	
31	1	
32		1
34.5	1	
38		1
39.5		1
41		1
42.5		1
Total number of students	29	30
Total number of errors	429	442

TABLE 2

Results of First-year Russian Autumn Quarter Final Examination

(Common Portion)

Number of Errors	Computer-based	Regular
3.5	1	
5	2	1
6	3	
7	1	
8	2	
9	3	
11	3	
13		1
15	1	
16	1	1
17	2	
19		1
21	2	1
22	1	1
23		2
25	1	1
27	3	
29		1
30		1
31		2
33	1	
34		1
37	1	
38	1	
41		1
43		1
45		1
53		1
61		1
64		1
65		1
72		1
76		1
79		1
93		1
97		1
120		1
141		1
Total number of students	29	28
Total number of errors	457.5	1372.0
Total possible errors per student 350		

TABLE 3

Results of First-year Winter Quarter Midterm Examination

(Common Portion)

Number of Errors	Computer-based (Old)	Computer-based (New)	Computer-based (Total)	Regular
4	1		1	
4.5	1		1	
5	1		1	
5.5				1
6	2	1	3	1
7				1
7.5	1		1	
8	3		3	
8.5	2		2	1
9	1		1	
9.5	2		2	2
10				1
11				2
12.5				1
13	1		1	
13.5	1	1	2	
14	1		1	
14.5				1
15	1		1	
15.5				1
16.5	1		1	1
17	1		1	1
18	2		2	
18.5	2		2	
20	1		1	
32	1		1	
36				1
Total number of students	26	2	28	15
Total number of errors	316	19.5	335.5	190
Average number of errors	12.10	9.75	12.0	12.7

TABLE 4

Results of First-year Winter Quarter Final Examination

(Common Portion)

Number of Errors	Computer-based (Old)	Computer-based (New)	Computer-based (Total)	Regular
2	1		1	
6	1		1	
6.5	1		1	
8	1		1	
9.5				1
10	1		1	
11				1
12	2		2	
13				1
14.5				1
16	1		1	
16.5	1		1	
18	1		1	
18.5	1		1	
19	1		1	
19.5				1
21	2		2	
22.5	1		1	1
23		1	1	1
23.5	1		1	
24	1		1	
24.5				1
25	1		1	
26.5				1
27	1		1	
29.5	1		1	
30				1
30.5				1
32.5				1
33	1		1	
37.5	2		2	
38		1	1	
39.5	1		1	
41	1		1	2
47.5				1
Total number of students	25	2	27	15
Total number of errors	526.5	61	587.5	386.5
Average number of errors	21.06	30.5	21.8	25.8

TABLE 5

Results of First-year Spring Quarter Midterm Examination

(Common Portion)

Number of Errors	Computer-based (Old)	Computer-based (New)	Computer-based (Total)	Regular
4.5				1
5.5	1		1	
6	1		1	1
6.5		1	1	
7.5	1		1	
8	1		1	1
8.5	1		1	
9	1		1	
10				1
11				1
12.5	1		1	
13	1		1	1
13.5	2		2	1
14	2		2	
14.5	1		1	
15	1		1	1
16				3
17	3		3	1
17.5				1
18.5				1
19		1	1	
20.5	1		1	
21.5	1		1	
22.5	1		1	
23	1		1	
33				1
43	1		1	
45.5				1
Total number of students	22	2	24	16
Total number of errors	336	25.5	361.5	260.5
Average number of errors	15.27	12.75	15.1	16.3

TABLE 6

Results of First-year Russian Spring Quarter Final Examination

(Common Portion)

Number of Errors	Computer-based (Old)	Computer-based (New)	Computer-based (Total)	Regular (Old)	Regular (New)	Regular (Total)	Transfer
21.5	1		1				
24.5	1		1				
26	1		1				
27	1		1				
31.5	1		1				
32	1		1				
34				1		1	
35	1		1	1		1	
37	1		1	1		1	
39				1		1	
40	1		1				
41				1		1	
42	1		1				
45	1		1				
46				1		1	
47.5		1	1				
50.5					1	1	
51.5	1		1				
60	1		1	1		1	
61	1		1				
63.5				1		1	
67					1	1	
69	1		1				
69.5	1		1				
73	1		1				
74.5	2		2		1	1	
76.5	1		1				
80.5				1		1	
81	1		1				
82		1	1				
89				1		1	
91				1		1	
92				1		1	
93	1		1				
106				1		1	
166							1
Total number of students	22	2	24	12	3	15	1
Total number of errors	1,145	129.5	1,274.5	779	192	971	166
Average number of errors	52.04	64.75	53.1	64.91	64	64.7	166

Appendix 8

Examples of Daily Summary Sheets

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DAILY RUSSIAN REPORT AS OF 10 APR. 1968     21:12

 PREVIOUS LESSON            NEXT
NO.      PCT. TIME         LESSON     STUDENT NUMBER AND NAME

95        73   53     --   96         02  LIZ BABCOCK
97        86   51          98         03  JANIE BONHAM
97        91   44          98         04  DOUGLAS BROTZ
97        85   46          98         05  LES BUSH
94        86   43     --   95         06  ANNE CHIAPELLA
97        72   46          98         07  KERI CHRISTENFELD
97        82   48          98         08  THOMAS CHUN
97        82   49          98         09  GEORGE ESTES
96        84   61     --   97         10  RICHARD GABLE
96        96   42     --   97         11  PETER GOLDSMITH
97        85   51          98         12  TIMOTHY GROVES
97        88   43          98         14  RONALD HARRIS
97        83   52          98         15  GREG HIBDON
93        93   35     --   94         16  DOUGLAS LEMPEREUR
96        80   53     --   97         17  PAUL MARIENTHAL
97        56   62     XX   97         18  TERRY MCFARLAND
97        80   60          98         19  FRED OAKFORD
97        85   49          98         20  ERIC OLSEN
97        91   52          98         21  RUSTY RUSSELL
95        82   56     --   96         22  JAY SPEAS
97        85   48          98         23  MELYN SPERRY
97        80   47          98         27  BECKY WILMOTH
97        82   49          98         28  SHARON WOOD
97        83   51          98         29  TOM KNAPP
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DAILY RUSSIAN REPORT AS OF 22 MAY  1968     20:53

 PREVIOUS LESSON          NEXT
NO.      PCT. TIME       LESSON      STUDENT NUMBER AND NAME

122       79   49    --   123        02  LIZ BABCOCK
 RESTART-PR.71-AUD.33     119        03  JANIE BONHAM
123       87   47         124        04  DOUGLAS BROTZ
123       81   49         124        05  LES BUSH
123       74   57         124        06  ANNE CHIAPELLA
123       83   47         124        07  KERI CHRISTENFELD
122       74   52    --   123        08  THOMAS CHUN
123       81   53         124        09  GEORGE ESTES
122       80   59    --   123        10  RICHARD GABLE
122       83   48    --   123        11  PETER GOLDSMITH
123       92   54         124        12  TIMOTHY GROVES
121       86   51    --   122        14  RONALD HARRIS
123       80   53         124        15  GREG HIBDON
123       85   54         124        16  DOUGLAS LEMPEREUR
121       86   55    --   122        17  PAUL MARIENTHAL
122       71   57    --   123        18  TERRY MCFARLAND
122       68   66    XX   122        19  FRED OAKFORD
123       79   53         124        20  ERIC OLSEN
123       88   47         124        21  RUSTY RUSSELL
121       81   56    --   122        22  JAY SPEAS
123       82   54         124        23  MELYN SPERRY
123       80   54         124        27  BECKY WILMOTH
123       88   54         124        28  SHARON WOOD
121       84   56    --   122        29  TOM KNAPP
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DAILY RUSSIAN REPORT AS OF  7 JUNE 1968     02:49

 PREVIOUS LESSON          NEXT
NO.      PCT. TIME       LESSON     STUDENT NUMBER AND NAME

133       A:>  23     XX  133       02  LIZ BABCOCK
132       67   57     XX  132       03  JANIE BONHAM
135       82   32         136       04  DOUGLAS BROTZ
134       94   16     --  135       05  LES BUSH
133       66   100    XX  133       06  ANNE CHIAPELLA
133       81   56     --  134       07  KERI CHRISTENFELD
135       77   38         136       08  THOMAS CHUN
133       54   78     XX  133       09  GEORGE ESTES
133       58   96     XX  133       10  RICHARD GABLE
135       81   29         136 R     11  PETER GOLDSMITH
133       48   91     XX  133       12  TIMOTHY GROVES
133       86   52     --  134       14  RONALD HARRIS
133       74   82     --  134       15  GREG HIBDON
133       57   77     XX  133       16  DOUGLAS LEMPEREUR
133       49   79     XX  133       17  PAUL MARIENTHAL
133       37   65     XX  134       18  TERRY MCFARLAND
133       60   89     XX  133       19  FRED OAKFORD
133       65   78     XX  133       20  ERIC OLSEN
133       82   70     --  134       21  RUSTY RUSSELL
 RESTART-PR.56-NO AUD     132       22  JAY SPEAS
133       85   60     --  134       23  MELYN SPERRY
133       73   70     --  134       27  BECKY WILMOTH
135       78   35         136       28  SHARON WOOD
133       45   81     XX  133       29  TOM KNAPP
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Appendix 9

Samples of Summaries from Data Report

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LESSON   10
NUMBER OF PROBLEMS  252
NUMBER OF STUDENTS  WHO COMPLETED THIS LESSON   19

  PROB  AVCL  AVWL  TCR  PRCNT  TWRG  PRCNT  TR2  PRCNT  TR3  PRCNT  TTO  PRCNT
   1.1   0.9   1.9   12   63.2     7   36.8    6   85.7    1   14.3
   2.1   0.5         19  100.0
   3.1   0.7   0.9   18   94.7     1    5.3    1  100.0
   4.1   0.8         18   94.7     1    5.3    1  100.0
   5.1   0.4   1.4   17   89.5     2   10.5    2  100.0
   6.1   0.4         19  100.0
   7.1   0.4         19  100.0
   8.1   0.8         19  100.0
   9.1   2.3   3.2   18   94.7     1    5.3    1  100.0
  10.1   0.7         19  100.0
  11.1   0.6         19  100.0
  12.1   3.3         19  100.0
  13.1   2.3   4.1   18   94.7     1    5.3    1  100.0
  14.1   1.2         19  100.0
  15.1   4.0         19  100.0
  16.1   1.5         18   94.7                  1  100.0                1    5.3
  17.1   1.5   1.1   11   57.9     7   36.8    4   50.0    4   50.0    1    5.3
  18.1   0.9   3.4   18   94.7     1    5.3    1  100.0
  19.1   0.5   1.7   18   94.7     1    5.3    1  100.0
  20.1   0.6         19  100.0
  21.1   0.9   3.4   15   78.9     4   21.1    1   25.0    3   75.0
  22.1   0.6   0.1   18   94.7     1    5.3    1  100.0
  23.1   1.5   1.1   18   94.7     1    5.3                1  100.0
  24.1   0.3         19  100.0
  25.1   1.2   1.6   17   89.5     1    5.3    1   50.0    1   50.0    1    5.3
  26.1   3.5   4.4   11   57.9     8   42.1    4   50.0    4   50.0
  27.1   2.4         19  100.0
  28.1   1.7         19  100.0
  29.1   0.5   0.7   17   89.5     2   10.5    2  100.0
  30.1   0.6   1.3   18   94.7     1    5.3    1  100.0
  31.1   0.6   0.8   18   94.7     1    5.3    1  100.0
  32.1   0.4   0.5   18   94.7     1    5.3    1  100.0
  33.1   1.2   2.2   11   57.9     7   36.8    4   50.0    4   50.0    1    5.3
  34.1   0.9   0.7   15   78.9     4   21.1    4  100.0
  35.1   0.7         19  100.0
  36.1   0.6   2.7   18   94.7     1    5.3                1  100.0
  37.1   1.9   1.3   18   94.7     1    5.3    1  100.0
  38.1   2.3  10.2   11   57.9     8   42.1    7   87.5    1   12.5
  39.1   1.3         19  100.0
  40.1   0.9         19  100.0
  41.1   2.1         19  100.0
  42.1   1.0         19  100.0
  43.1   1.5         19  100.0
  44.1   1.7         19  100.0
  44.2   1.6         19  100.0
  45.1   1.8   4.9   16   84.2     3   15.8    2   66.7    1   33.3
  46.1   3.0         19  100.0
```

47.1	0.7	1.3	16	84.2	2	10.5	3	100.0			1	5.3
48.1	0.6	0.0	18	94.7	1	5.3	1	100.0				
49.1	0.6	61.4	17	89.5	2	10.5	2	100.0				
50.1	0.8	0.7	16	84.2	3	15.8	3	100.0				
51.1	3.8	3.9	8	42.1	11	57.9	3	27.3	8	72.7		
52.1	2.4	3.3	16	84.2	3	15.8	3	100.0				
53.1	2.3	7.3	16	84.2	2	10.5	3	100.0			1	5.3
54.1	8.7		19	100.0								
55.1	1.3		18	94.7	1	5.3	1	100.0				
56.1	1.4		19	100.0								
57.1	1.3		19	100.0								
58.1	0.8	3.1	11	57.9	8	42.1	4	50.0	4	50.0		
59.1	0.7		19	100.0								
60.1	0.7	1.8	18	94.7	1	5.3	1	100.0				
61.1	3.0		19	100.0								
61.2	1.9		19	100.0								
62.1	1.5		18	94.7			1	100.0			1	5.3
63.1	2.0		19	100.0								
64.1	1.4	1.1	14	73.7	5	26.3	2	40.0	3	60.0		
65.1	0.6	1.0	17	89.5	2	10.5	2	100.0				
66.1	1.0	0.7	13	68.4	6	31.6	5	83.3	1	16.7		
67.1	0.8	1.1	17	89.5	2	10.5	2	100.0				
68.1	1.4		19	100.0								
69.1	0.6		19	100.0								
70.1	2.0	2.0	17	89.5	2	10.5	1	50.0	1	50.0		
71.1	4.0	3.4	15	78.9	4	21.1	4	100.0				
72.1	0.6	1.3	18	94.7	1	5.3	1	100.0				
73.1	1.7	0.7	12	63.2	7	36.8	6	85.7	1	14.3		
74.1	0.5	1.8	18	94.7	1	5.3	1	100.0				
75.1	0.9	1.8	16	84.2	2	10.5	2	66.7	1	33.3	1	5.3
76.1	1.1	1.2	18	94.7	1	5.3	1	100.0				
77.1	0.8		19	100.0								
78.1	1.2	1.0	11	57.9	8	42.1	5	62.5	2	25.0		
79.1	5.4	3.7	2	10.5	17	89.5	3	17.6	12	70.6		
80.1	0.8		19	100.0								
81.1	3.9	13.4	8	42.1	11	57.9	3	27.3	8	72.7		
82.1	2.3	3.7	16	84.2	2	10.5	1	33.3	2	66.7	1	5.3
83.1	1.4	0.9	10	52.6	7	36.8	5	55.6	4	44.4	2	10.5
84.1	2.3	8.7	15	78.9	4	21.1	2	50.0	2	50.0		
85.1	1.1	2.7	18	94.7	1	5.3	1	100.0				
86.1	2.3	5.1	7	36.8	8	42.1	5	41.7	7	58.3	4	21.1
87.1	5.3	6.4	15	78.9	3	15.8	3	75.0	1	25.0	1	5.3
88.1	1.9	0.0	18	94.7	1	5.3	1	100.0				
89.1	0.7	0.7	18	94.7	1	5.3	1	100.0				
90.1	1.0	1.8	7	36.8	10	52.6	10	83.3	2	16.7	2	10.5
91.1	3.7		18	94.7			1	100.0			1	5.3
92.1	2.1		19	100.0								
93.1	2.4	6.3	14	73.7	5	26.3	4	80.0	1	20.0		
94.1	2.9		19	100.0								
95.1	2.2	42.4	15	78.9	3	15.8	3	75.0	1	25.0	1	5.3
96.1	2.1		18	94.7			1	100.0			1	5.3
97.1	3.1	2.4	13	68.4	5	26.3	2	33.3	4	66.7	1	5.3
98.1	1.2	1.5	11	57.9	8	42.1	3	37.5	5	62.5		
99.1	0.9	2.2	10	52.6	9	47.4	4	44.4	5	55.6		
100.1	0.5		18	94.7							1	5.3

101.1	1.0	2.5	12	63.2	7	36.8	4	57.1	2	28.6		
102.1	0.7	1.9	12	63.2	6	31.6	2	28.6	5	71.4	1	5.3
103.1	1.5	13.6	10	52.6	7	36.8	3	33.3	6	66.7	2	10.5
104.1	0.7		19	100.0								
105.1	3.4	0.1	17	89.5	1	5.3	2	100.0			1	5.3
106.1	1.2	1.2	17	89.5	1	5.3	2	100.0			1	5.3
107.1	0.9		19	100.0								
108.1	1.2		18	94.7	1	5.3	1	100.0				
109.1	1.7	1.2	9	47.4	10	52.6	6	60.0	4	40.0		
110.1	1.1	1.5	18	94.7	1	5.3	1	100.0				
111.1	0.7		19	100.0								
112.1	1.1		19	100.0								
113.1	0.8		19	100.0								
114.1	0.7	0.1	18	94.7	1	5.3	1	100.0				
115.1	1.0	1.8	10	52.6	9	47.4	6	66.7	3	33.3		
116.1	1.6	4.3	8	42.1	10	52.6	5	45.5	6	54.5	1	5.3
117.1	1.3		19	100.0								
118.1	0.8	1.0	18	94.7	1	5.3	1	100.0				
119.1	1.0	0.9	18	94.7	1	5.3	1	100.0				
120.1	0.7	2.0	6	31.6	12	63.2	9	69.2	3	23.1	1	5.3
121.1	1.8	4.1	4	21.1	15	78.9	5	33.3	10	66.7		
122.1	1.0		19	100.0								
123.1	1.0		19	100.0								
124.1	1.6	0.1	18	94.7	1	5.3	1	100.0				
125.1	3.3	0.1	18	94.7	1	5.3	1	100.0				
126.1	0.9	3.2	7	36.8	12	63.2	7	58.3	5	41.7		
127.1	3.0	2.8	8	42.1	9	47.4	5	45.5	6	54.5	2	10.5
128.1	0.8	0.7	17	89.5	2	10.5	2	100.0				
129.1	1.2	1.3	4	21.1	15	78.9	9	60.0	5	33.3		
130.1	0.8	0.8	18	94.7	1	5.3	1	100.0				
131.1	1.6	1.1	8	42.1	7	36.8	6	54.5	4	36.4	4	21.1
132.1	0.8	1.8	18	94.7	1	5.3	1	100.0				
133.1	1.6	2.5	15	78.9	4	21.1	2	50.0	2	50.0		
134.1	0.7	1.3	17	89.5	2	10.5	1	50.0	1	50.0		
135.1	1.5	5.1	9	47.4	8	42.1	5	50.0	5	50.0	2	10.5
136.1	1.5	3.4	10	52.6	8	42.1	6	66.7	3	33.3	1	5.3
137.1	2.2	3.6	12	63.2	6	31.6	4	57.1	3	42.9	1	5.3
138.1	1.0		19	100.0								
139.1	2.1		19	100.0								
140.1	1.1		19	100.0								
141.1	1.4	4.0	15	78.9	4	21.1	2	50.0	2	50.0		
142.1	0.9	0.9	18	94.7	1	5.3	1	100.0				
143.1	0.9		18	94.7	1	5.3			1	100.0		
144.1	0.4		19	100.0								
145.1	1.6	0.7	18	94.7	1	5.3	1	100.0				
146.1	0.8		18	94.7	1	5.3	1	100.0				
147.1	1.0	2.4	12	63.2	7	36.8	5	71.4	1	14.3		
148.1	3.8	1.0	16	84.2	3	15.8	1	33.3	2	66.7		
149.1	2.9	6.0	17	89.5	1	5.3	2	100.0			1	5.3
150.1	0.7	31.1	17	89.5	2	10.5	2	100.0				
151.1	1.2	4.8	12	63.2	5	26.3	4	57.1	3	42.9	2	10.5
152.1	1.2	1.6	7	36.8	12	63.2	10	83.3	2	16.7		
153.1	1.7		19	100.0								
154.1	0.7		19	100.0								
155.1	1.1	1.4	17	89.5	2	10.5	2	100.0				

156.1	1.3	1.6	10	52.6	9	47.4	3	33.3	6	66.7		
157.1	1.7	11.2	13	68.4	6	31.6	4	66.7	2	33.3		
158.1	0.6	1.5	10	52.6	9	47.4	6	66.7	3	33.3		
159.1	1.3	3.4	15	78.9	4	21.1	2	50.0	2	50.0		
160.1	0.8	1.3	13	68.4	4	21.1	4	66.7	2	33.3	2	10.5
161.1	0.8	1.1	12	63.2	6	31.6	7	100.0			1	5.3
162.1	1.3	2.0	12	63.2	6	31.6	4	57.1	3	42.9	1	5.3
163.1	1.3	4.9	10	52.6	8	42.1	7	77.8	2	22.2	1	5.3
164.1	0.8	2.3	13	68.4	5	26.3	4	66.7	1	16.7	1	5.3
165.1	1.4	3.0	11	57.9	8	42.1	6	75.0	2	25.0		
166.1	0.7		19	100.0								
167.1	1.1	2.3	14	73.7	5	26.3	4	80.0	1	20.0		
168.1	0.9		19	100.0								
169.1	2.9	4.0	10	52.6	9	47.4	2	22.2	7	77.8		
170.1	0.8		19	100.0								
171.1	1.1	0.8	16	84.2	3	15.8	3	100.0				
172.1	1.2		19	100.0								
173.1	0.8		18	94.7	1	5.3	1	100.0				
174.1	0.7		19	100.0								
175.1	0.7	1.0	18	94.7	1	5.3	1	100.0				
176.1	3.6	7.6	16	84.2	3	15.8	2	66.7	1	33.3		
177.1	1.0		18	94.7	1	5.3	1	100.0				
178.1	1.3	5.3	17	89.5	2	10.5	2	100.0				
179.1	1.2	1.1	14	73.7	4	21.1	4	80.0	1	20.0	1	5.3
180.1	0.8	1.1	12	63.2	7	36.8	7	100.0				
181.1	0.8		19	100.0								
182.1	2.4	1.5	16	84.2	3	15.8	3	100.0				
183.1	0.7		19	100.0								
184.1	3.6	13.0	12	63.2	6	31.6	4	57.1	3	42.9	1	5.3
185.1	1.7		19	100.0								
186.1	1.7	5.9	18	94.7	1	5.3	1	100.0				
187.1	1.0		19	100.0								
188.1	1.9	1.9	5	26.3	11	57.9	8	57.1	6	42.9	3	15.8
189.1	1.4	2.1	8	42.1	11	57.9	8	72.7	3	27.3		
190.1	1.9	1.3	14	73.7	5	26.3	5	100.0				
191.1	0.7		19	100.0								
192.1	0.7	0.9	16	84.2	3	15.8	2	66.7	1	33.3		
193.1	2.0	1.5	18	94.7	1	5.3	1	100.0				
194.1	1.0	2.6	14	73.7	4	21.1	3	60.0	1	20.0	1	5.3
195.1	0.6	2.0	14	73.7	5	26.3	5	100.0				
196.1	0.6	3.2	13	68.4	6	31.6	2	33.3	4	66.7		
197.1	0.7		19	100.0								
198.1	1.3	1.0	17	89.5	2	10.5	1	50.0	1	50.0		
199.1	0.8	1.9	11	57.9	6	31.6	3	37.5	5	62.5	2	10.5
200.1	1.8	2.8	11	57.9	7	36.8	5	62.5	3	37.5	1	5.3
201.1	1.0	3.3	4	21.1	15	78.9	10	66.7	5	33.3		
202.1	0.7	2.1	12	63.2	7	36.8	3	42.9	4	57.1		
203.1	3.1	4.1	16	84.2	3	15.8	2	66.7	1	33.3		
204.1	1.2		19	100.0								
205.1	2.4	1.5	7	36.8	10	52.6	8	66.7	4	33.3	2	10.5
206.1	0.9	1.3	12	63.2	7	36.8	6	85.7	1	14.3		
207.1	1.2	1.4	12	63.2	5	26.3	6	85.7	1	14.3	2	10.5
208.1	1.1	1.4	12	63.2	7	36.8	6	85.7	1	14.3		
209.1	1.8		19	100.0								
210.1	0.8		19	100.0								

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211.1   0.7         19 100.0
212.1   1.1   0.8   16  84.2     3  15.8     3 100.0
213.1   1.1   1.6   12  63.2     7  36.8     7 100.0
214.1   1.1   0.8   18  94.7     1   5.3     1 100.0
215.1   1.0   1.0   18  94.7     1   5.3     1 100.0
216.1   1.1   1.5   12  63.2     7  36.8     6  85.7
217.1   2.6         19 100.0
218.1   1.5         19 100.0
219.1   1.9   3.3    6  31.6    13  68.4     4  30.8     8  61.5
220.1   1.1   5.2   18  94.7     1   5.3     1 100.0
221.1   1.1   1.1    8  42.1    10  52.6    10  90.9     1   9.1     1   5.3
222.1   1.5   1.5   18  94.7     1   5.3     1 100.0
223.1   0.7   1.5   16  84.2     3  15.8     3 100.0
224.1   0.5   1.3    4  21.1    15  78.9     6  40.0     9  60.0
225.1   1.7   3.5   18  94.7     1   5.3     1 100.0
226.1   1.0   1.8   18  94.7     1   5.3     1 100.0
227.1   0.9         19 100.0
228.1   1.4         19 100.0
229.1   1.7         19 100.0
230.1   0.9   2.4   16  84.2     2  10.5     3 100.0                 1   5.3
231.1   0.5  20.0   18  94.7     1   5.3     1 100.0
232.1   0.8   4.0   16  84.2     3  15.8     2  66.7     1  33.3
233.1   0.7         19 100.0
234.1   0.8   1.0   13  68.4     6  31.6     2  33.3     4  66.7
235.1   0.8   0.7   16  84.2     3  15.8     3 100.0
236.1   1.0   1.1   17  89.5     1   5.3     1  50.0     1  50.0     1   5.3
237.1   0.7         19 100.0
238.1   0.7         19 100.0
239.1   1.4   0.7   11  57.9     6  31.6     6  75.0     2  25.0     2  10.5
240.1   0.8   0.9    8  42.1    11  57.9     7  63.6     4  36.4
241.1   1.0   0.1   17  89.5     1   5.3     2 100.0                 1   5.3
242.1   1.2         19 100.0
243.1   0.9   2.1   16  84.2     3  15.8     2  66.7     1  33.3
244.1   0.8         19 100.0
245.1   1.1   1.0   18  94.7     1   5.3     1 100.0
246.1   0.8         19 100.0
247.1   0.5   1.8    3  15.8    13  68.4     8  50.0     8  50.0     3  15.8
248.1   0.8   0.6   10  52.6     9  47.4     7  77.8     2  22.2
249.1   0.7   0.8   16  84.2     2  10.5     3 100.0                 1   5.3
250.1   1.0   1.5   16  84.2     2  10.5     2  66.7     1  33.3     1   5.3
251.1   1.0   0.7    3  15.8    16  84.2     7  43.8     9  56.3
252.1         0.9               19 100.0     7  36.8    11  57.9

END OF DATA ANALYSIS FOR LESSON   10
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LESSON   62
NUMBER OF PROBLEMS  121
NUMBER OF STUDENTS WHO COMPLETED THIS LESSON   28

  PROB AVCL AVWL TCR PRCNT TWRG PRCNT TR2 PRCNT TR3 PRCNT TTO PRCNT
FOLLOWING PROBLEM WAS CHANGED
   1.1  1.1       18  64.3                                    2   7.1
   2.1  0.8  2.2  24  85.7    3  10.7   4 133.3
   3.1  0.5  0.4  24  85.7    4  14.3   4 100.0
   4.1  0.7  0.9  17  60.7   11  39.3  11 100.0
   5.1  0.6  0.3  26  92.9    2   7.1   2 100.0
   6.1  0.8  1.9  24  85.7    4  14.3   4 100.0
   7.1  0.7  0.8  24  85.7    4  14.3   4 100.0
   8.1  0.6  1.0  25  89.3    3  10.7   3 100.0
   9.1  0.7  2.4  11  39.3   17  60.7  15  88.2
  10.1  1.3  7.0  23  82.1    5  17.9   5 100.0
  11.1  2.8  7.5  19  67.9    5  17.9   3  33.3                   4  14.3
  11.2  1.8  4.1  23  82.1    5  17.9   4  80.0
  11.3  1.3  4.9  27  96.4    1   3.6   1 100.0
  12.1  1.9  4.5  25  89.3    2   7.1   3 100.0                   1   3.6
  12.2  1.5  0.4  27  96.4    1   3.6
  13.1  4.0       28 100.0
  13.2  2.3  3.7  25  89.3    2   7.1   3 100.0                   1   3.6
  13.3  1.1  4.5  27  96.4    1   3.6   1 100.0
  14.1  2.0  6.1  20  71.4    6  21.4   6  75.0                   2   7.1
  14.2  1.5       28 100.0
  14.3  1.3       28 100.0
  15.1  1.6       28 100.0
  16.1  0.7  1.4  26  92.9    2   7.1   2 100.0
  17.1  0.7  1.1  27  96.4    1   3.6   1 100.0
  18.1  0.9  0.9  26  92.9    1   3.6   2 100.0                   1   3.6
  19.1  0.8  0.9  25  89.3    3  10.7   3 100.0
  20.1  1.0  1.9  20  71.4    8  28.6
  21.1  0.9  1.1  22  78.6    5  17.9                             1   3.6
  22.1  1.0  0.6  26  92.9    2   7.1
  23.1  0.7  0.7  27  96.4    1   3.6
  24.1  1.2  1.9  17  60.7   11  39.3
  25.1  0.8  0.8  21  75.0    7  25.0
  26.1  1.0  1.7  24  85.7    4  14.3
  27.1  0.7  0.7  26  92.9    2   7.1
  28.1  1.5       28 100.0
  29.1  3.8  5.9  20  71.4    6  21.4                             2   7.1
  30.1  1.9       28 100.0
  31.1  2.8  8.2  24  85.7    3  10.7                             1   3.6
  32.1  2.8  5.6  23  82.1    2   7.1                             3  10.7
  33.1  2.1       27  96.4                                        1   3.6
  34.1  1.6       28 100.0
  35.1  1.1       28 100.0
  36.1  1.4       28 100.0
  37.1  1.0  1.0  27  96.4    1   3.6
  38.1  0.7       28 100.0
  39.1  0.7  2.5  27  96.4    1   3.6
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     40.1   0.9   0.9  25   89.3    3  10.7
     41.1   0.7   1.1  27   96.4    1   3.6
     42.1   0.7        28  100.0
     43.1   0.9   0.9  24   85.7    3  10.7                                 1   3.6
     44.1   0.8   1.2  26   92.9    2   7.1
     45.1   0.9   0.9  23   82.1    5  17.9
     46.1   1.0   0.2  26   92.9    2   7.1
 FOLLOWING PROBLEM WAS CHANGED
     47.1   1.9   3.3   2    7.1    7  25.0
     48.1   4.1   4.9  24   85.7    6  21.4    4  57.1                      1   3.6
     50.1   0.9   0.3  27   96.4    1   3.6    1 100.0
     51.1   0.8   0.3  27   96.4    1   3.6    1 100.0
     52.1   0.9        28  100.0
     53.1   0.8   1.4  27   96.4    1   3.6    1 100.0
     54.1   1.6   4.7  13   46.4   14  50.0   15 100.0                      1   3.6
     55.1   0.7   3.9  18   64.3   10  35.7   10 100.0
     56.1   1.2   5.5  26   92.9    2   7.1    2 100.0
     57.1   2.5   9.5  25   89.3    3  10.7
     58.1   1.9   3.9  26   92.9    2   7.1
     59.1   2.9   5.7  25   89.3    3  10.7
     60.1   1.6        28  100.0
     61.1   1.5   0.3  27   96.4    1   3.6
     62.1   0.3   0.5  21   75.0    6  21.4    7 100.0                      1   3.6
     63.1   2.2   2.3  26   92.9    2   7.1
     64.1   1.9        28  100.0
     64.2   1.3        28  100.0
     65.1   1.3   1.1  27   96.4    1   3.6
     65.2   1.9        28  100.0
     66.1   1.9   2.9  27   96.4    1   3.6
     66.2   1.6   1.4  27   96.4    1   3.6
     67.1   2.2        27   96.4                                            1   3.6
     67.2   3.7   5.1  12   42.9   14  50.0                                 2   7.1
     68.1   2.3        28  100.0
     68.2   2.1   4.2  22   78.6    6  21.4
     69.1   1.7   1.5  27   96.4    1   3.6
     69.2   2.1   7.1  25   89.3    3  10.7
     70.1   1.4        28  100.0
     70.2   2.9   5.9  23   82.1    5  17.9
     71.1   1.7        28  100.0
     71.2   1.9        27   96.4                                            1   3.6
     72.1   1.7        28  100.0
     72.2   5.2   6.0  15   53.6   13  46.4
 FOLLOWING PROBLEM WAS CHANGED
     73.1   1.0   1.6  22   78.6    2   7.1
     74.1   0.9   3.4  25   89.3    2   7.1    3 150.0
     75.1   0.7   1.3  26   92.9    2   7.1    2 100.0
     76.1   0.7   0.3  26   92.9    2   7.1    2 100.0
     77.1   0.7   1.1  26   92.9    2   7.1    2 100.0
     78.1   1.9   1.7  24   85.7    4  14.3
     79.1   1.0   3.0  26   92.9    2   7.1
 FOLLOWING PROBLEM WAS CHANGED
     80.1   0.8   0.6   2    7.1    1   3.6
     82.1   0.3   2.3  17   60.7   33 117.9   10  29.4                      1   3.6
     83.1   0.5   3.1  22   78.6    5  17.9    5  45.3                      1   3.6
     84.1   0.5   3.0  14   50.0    9  32.1   10  71.4                      5  17.9
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FOLLOWING PROBLEM WAS CHANGED
   85.1   3.4   1.3    5  17.9    17  60.7     7  24.1                   1   3.6
   86.1   3.4   3.5   11  39.3    17  60.7    10  34.5
   87.1   1.1   1.1   16  57.1    12  42.9
   88.1   3.4   1.1   23  82.1     5  17.9
   89.1   5.7   4.7   23  82.1     4  14.3                               1   3.6
   89.2   2.4   5.5   26  92.9     2   7.1
   89.3   4.1   4.4   25  89.3     3  10.7
   90.1   2.4   3.2   12  42.9    16  57.1
   90.2   2.0   3.0   27  96.4     1   3.6
   91.1   1.4         28 100.0
   91.2   2.5   4.3   26  92.9     2   7.1
   92.1   6.4  10.0   22  78.6     4  14.3                               2   7.1
   93.1   2.9   4.7   13  46.4    14  50.0                               1   3.6
   93.2   2.0   7.6   24  85.7     3  10.7                               1   3.6
   94.1   2.1   3.5   26  92.9     2   7.1
   94.2   2.1   3.4   25  89.3     2   7.1                               1   3.6
   95.1   2.3   4.7   23  82.1     5  17.9
   95.2   3.6   2.0   26  92.9     2   7.1
   96.1   1.7   5.5   23  82.1     5  17.9
   97.1   1.2   1.6   21  75.0     7  25.0
   98.1   1.6   2.3   20  71.4     8  28.6
   99.1   2.0   5.1   12  42.9    16  57.1
  100.1   2.2   2.5   20  71.4     8  28.6
  101.1   1.2   6.1   15  53.6    13  46.4
  102.1   2.3   4.5   13  46.4    15  53.6
  103.1   2.3   2.1   19  67.9     9  32.1
  104.1   3.0   2.2   24  85.7     4  14.3
  105.1   1.7   1.0   26  92.9     2   7.1
  106.1   1.7   2.7   23  82.1     5  17.9
  107.1   2.5   3.2   22  78.6     6  21.4
  108.1   2.4   4.0   20  71.4     8  28.6
  109.1   2.3   5.2   22  78.6     6  21.4
  110.1   4.4   6.3   11  39.3    17  60.7
  111.1   3.5   3.5   26  92.9     2   7.1
  112.1   4.1   2.2   22  78.6     6  21.4
  113.1   3.1   4.3   24  85.7     4  14.3
  114.1   1.1   1.6   22  78.6     5  17.9                               1   3.6
  115.1   1.1   1.3   27  96.4     1   3.6
  116.1   1.1   4.4   16  57.1     8  28.6                               4  14.3
  117.1   0.5   1.4    5  17.9    19  67.9                               4  14.3
  118.1   0.5   2.6    9  32.1    18  64.3                               1   3.6
  119.1   0.4   1.1   24  85.7     4  14.3     4 100.0
  120.1   0.6   1.0   25  89.3     3  10.7     3 100.0
  121.1   3.7   3.9   19  67.9     7  25.0     7  77.8                   2   7.1

END OF DATA ANALYSIS FOR LESSON   42
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LESSON  103
NUMBER  OF PROBLEMS  204
NUMBER  OF STUDENTS  WHO COMPLETED THIS LESSON   23

  PROB AVCL AVWL  TCR PRCNT  TWRG PRCNT  TR2 PRCNT  TR3 PRCNT  TTO PRCNT
   1.1  0.9        23 100.0
   2.1  0.8  1.1   17  73.9     6  26.1    6 100.0
   3.1  0.7  1.0   20  87.0     2   8.7    3 100.0                1   4.3
   4.1  0.8  0.9   22  95.7     1   4.3    1 100.0
   5.1  0.7  0.9   20  87.0     3  13.0    3 100.0
   6.1  0.7        23 100.0
   7.1  0.7  0.8   21  91.3     2   8.7    2 100.0
   8.1  0.7        23 100.0
   9.1  0.5        23 100.0
  10.1  1.0  2.7   19  82.6     4  17.4    4 100.0
  11.1  0.6  0.6   17  73.9     6  26.1    1  16.7
  12.1  0.6        23 100.0
  13.1  0.6  0.9   22  95.7     1   4.3
  14.1  1.1  2.5   22  95.7     1   4.3    1 100.0
  15.1  0.6        23 100.0
  16.1  1.6  3.4   21  91.3     1   4.3    2 100.0                1   4.3
  17.1  0.7        23 100.0
  18.1  0.7        23 100.0
  19.1  0.6  1.1   22  95.7     1   4.3
  20.1  0.6  7.3   20  87.0     3  13.0
  21.1  0.6  2.4    9  39.1    14  60.9
  22.1  0.6  1.1   20  87.0     3  13.0
  23.1  0.7  5.4   20  87.0     2   8.7                            1   4.3
  24.1  0.6        23 100.0
  25.1  1.0  1.1   22  95.7     1   4.3
  26.1  0.4        23 100.0
  27.1  0.8  0.7   18  78.3     5  21.7
  28.1  1.7  1.8   15  65.2     8  34.8
  29.1  1.2  4.0   17  73.9     6  26.1
  30.1  1.1  5.2   21  91.3     2   8.7
  31.1  3.1  3.3   14  60.9     9  39.1
  32.1  2.3  4.0   17  73.9     6  26.1
  33.1  3.0  3.7   19  82.6     4  17.4
  34.1  1.6        23 100.0
  35.1  2.2  1.6   18  78.3     5  21.7
  36.1  0.9        23 100.0
  37.1  3.9  3.5    7  30.4    16  69.6
  38.1  1.8  2.7   13  56.5    10  43.5
  39.1  1.5  1.5   12  52.2    11  47.8
  40.1  2.0  2.4   14  60.9     9  39.1
  41.1  0.6  3.5   22  95.7     1   4.3
  42.1  0.7  1.9   13  56.5    10  43.5
  43.1  0.8  1.1   15  65.2     8  34.8
  44.1  0.5  1.1   19  82.6     4  17.4
  45.1  1.5  2.5   15  65.2     8  34.8
  46.1  0.9  2.5   12  52.2    11  47.8
  47.1  1.2  2.2   18  78.3     5  21.7
```

48.1	1.1	4.1	19	82.6	4	17.4				
49.1	2.2	3.9	19	82.6	4	17.4				
50.1	1.5	0.9	22	95.7	1	4.3				
51.1	2.3	4.1	12	52.2	11	47.8				
52.1		1.7			23	100.0				
53.1	3.6	6.3	16	69.6	7	30.4				
54.1	0.9	2.5	16	69.6	7	30.4	7	100.0		
55.1	1.0	4.3	14	60.9	9	39.1	9	100.0		
56.1	0.6		23	100.0						
57.1	0.5	2.0	20	87.0	3	13.0	3	100.0		
58.1	0.7	3.5	15	65.2	7	30.4	8	100.0	1	4.3
59.1	0.6		23	100.0						
60.1	0.4		23	100.0						
61.1	0.7	6.1	21	91.3	2	8.7	2	100.0		
62.1	0.5		23	100.0						
63.1	0.6	2.1	18	78.3	5	21.7	5	100.0		
64.1	0.6	0.6	21	91.3	2	8.7	2	100.0		
65.1	1.3	4.1	19	82.6	4	17.4				
66.1	1.8	2.0	17	73.9	6	26.1				
67.1	1.6	5.0	22	95.7	1	4.3				
68.1	0.8		23	100.0						
69.1	1.3	1.6	20	87.0	3	13.0				
70.1	0.8	1.2	14	60.9	9	39.1				
71.1	0.6	1.6	20	87.0	3	13.0				
72.1	0.6	0.5	20	87.0	3	13.0				
73.1	1.3	3.1	22	95.7	1	4.3				
74.1	1.4	3.5	20	87.0	3	13.0				
75.1	2.0	1.0	22	95.7	1	4.3				
76.1	1.2	3.4	12	52.2	11	47.8				
77.1	1.1	2.6	15	65.2	8	34.8				
78.1	1.4		23	100.0						
79.1	0.9		23	100.0						
80.1	0.6	1.1	19	82.6	4	17.4				
81.1	0.6		23	100.0						
82.1	0.7	0.7	17	73.9	6	26.1				
83.1	0.6	0.8	12	52.2	11	47.8				
84.1	1.2	5.3	19	82.6	4	17.4				
85.1	0.7	0.8	21	91.3	2	8.7	2	100.0		
86.1	0.8	1.7	17	73.9	5	21.7	6	100.0	1	4.3
87.1	0.7	1.3	19	82.6	4	17.4	4	100.0		
88.1	0.7	1.8	19	82.6	4	17.4	4	100.0		
89.1	0.7		23	100.0						
90.1	0.7	0.6	20	87.0	3	13.0	3	100.0		
91.1	0.7	2.8	21	91.3	2	8.7	2	100.0		
92.1	0.5		23	100.0						
93.1	0.5	0.6	22	95.7	1	4.3	1	100.0		
94.1	0.8		23	100.0						
95.1	0.7	3.8	16	69.6	7	30.4	7	100.0		
96.1	0.5	0.6	22	95.7	1	4.3	1	100.0		
97.1	0.6		23	100.0						
98.1	0.7		23	100.0						
99.1	0.8		23	100.0						
100.1	0.7		23	100.0						
101.1	1.2	3.1	20	87.0	3	13.0				
102.1	0.7		23	100.0						

103.1	0.8	3.4	22	95.7	1	4.3				
104.1	3.0	6.2	20	87.0	3	13.0				
105.1	1.7	4.8	20	87.0	3	13.0				
106.1	0.8	3.9	22	95.7	1	4.3				
107.1	0.8	2.6	19	82.6	4	17.4				
108.1	0.5		23	100.0						
109.1	0.9	2.4	20	87.0	3	13.0				
110.1	0.7	1.2	21	91.3	2	8.7				
111.1	0.6		23	100.0						
112.1	0.6		23	100.0						
113.1	0.7	1.0	21	91.3	2	8.7				
114.1	1.5	4.4	20	87.0	3	13.0				
115.1	0.8		23	100.0						
116.1	2.6	3.3	14	60.9	9	39.1				
117.1	1.1	2.8	20	87.0	3	13.0				
118.1	0.8		23	100.0						
119.1	1.3	1.8	21	91.3	2	8.7				
120.1	1.7	3.5	18	78.3	5	21.7				
121.1	0.7	3.2	13	56.5	10	43.5				
122.1	0.7	1.1	19	82.6	4	17.4				
123.1	0.7	1.3	17	73.9	6	26.1				
124.1	0.8	0.8	21	91.3	2	8.7	1	50.0		
125.1	0.5	0.1	21	91.3	2	8.7	1	50.0		
126.1	0.7		23	100.0						
127.1	0.7	0.9	19	82.6	4	17.4	4	100.0		
128.1	0.8	1.9	15	65.2	8	34.8	7	87.5		
129.1	0.6	0.5	21	91.3	2	8.7	2	100.0		
130.1	0.7	1.1	21	91.3	2	8.7	2	100.0		
131.1	0.7	0.7	21	91.3	2	8.7	2	100.0		
132.1	0.6	0.7	15	65.2	8	34.8	8	100.0		
133.1	0.5		23	100.0						
134.1	0.8	2.9	14	60.9	8	34.8	9	100.0	1	4.3
135.1	0.9	2.8	12	52.2	10	43.5	11	100.0	1	4.3
136.1	1.0	2.8	19	82.6	4	17.4	4	100.0		
137.1	0.7	1.1	20	87.0	3	13.0	3	100.0		
138.1	0.5	3.1	22	95.7	1	4.3	1	100.0		
139.1	0.8	0.6	16	69.6	7	30.4	5	71.4		
140.1	0.7	1.0	10	43.5	13	56.5				
141.1	0.7	1.3	15	65.2	8	34.8				
142.1	0.6	1.6	9	39.1	13	56.5			1	4.3
143.1	2.0	3.6	14	60.9	9	39.1				
144.1	1.5	2.2	22	95.7	1	4.3				
145.1	1.3	3.8	13	56.5	8	34.8	10	100.0	2	8.7
146.1	0.8	2.0	22	95.7	1	4.3	1	100.0		
147.1	1.1	2.9	15	65.2	7	30.4	8	100.0	1	4.3
148.1	0.7	1.2	22	95.7	1	4.3				
149.1	1.4	2.6	20	87.0	2	8.7	3	100.0	1	4.3
150.1	0.5	3.3	21	91.3	2	8.7	2	100.0		
151.1	0.7	5.3	18	78.3	5	21.7	5	100.0		
152.1	1.0	3.1	20	87.0	3	13.0	3	100.0		
153.1	0.4	1.1	21	91.3	2	8.7	2	100.0		
154.1	0.6	1.1	21	91.3	2	8.7	2	100.0		
155.1	0.8	1.7	19	82.6	4	17.4	4	100.0		
156.1	0.4	0.7	22	95.7	1	4.3	1	100.0		
157.1	0.5	6.7	22	95.7	1	4.3	1	100.0		

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158.1   0.6         23  100.0
159.1   0.5   0.7   22   95.7     1    4.3    1 100.0
160.1   0.7   4.0   17   73.9     6   26.1
161.1   0.8   1.8   13   56.5    10   43.5
162.1   0.7   1.8    6   26.1    16   69.6                        1   4.3
163.1   0.6   5.8   21   91.3     2    8.7
164.1   0.7   0.8   13   56.5    10   43.5
165.1   0.6   0.6   14   60.9     9   39.1
166.1   1.4   2.9    5   21.7    17   73.9                        1   4.3
167.1   1.2   3.2   17   73.9     6   26.1
168.1   1.6   4.3   12   52.2    10   43.5                        1   4.3
169.1   1.2   2.8   16   69.6     7   30.4
170.1   0.9   3.0   11   47.8    11   47.8                        1   4.3
171.1   0.6   3.3   16   69.6     7   30.4
172.1   1.7   4.0    3   13.0    20   87.0
173.1   1.4   4.3   15   65.2     8   34.8
174.1   3.2   3.3   13   56.5    10   43.5
175.1   1.2   3.5   13   56.5    10   43.5
176.1   1.7   2.5   13   56.5     8   34.8                        2   8.7
177.1   1.3   5.1   15   65.2     7   30.4    6  75.0             1   4.3
178.1   1.6   5.7   12   52.2    10   43.5   11 100.0             1   4.3
179.1   0.8   1.4   18   78.3     5   21.7    4  80.0
180.1   1.0   2.9   17   73.9     6   26.1    6 100.0
181.1   1.1   5.4   20   87.0     3   13.0    3 100.0
182.1   0.6         23  100.0
183.1   0.9   1.6   14   60.9     9   39.1    9 100.0
184.1   0.5   0.4   21   91.3     2    8.7    2 100.0
185.1   0.8   2.8   18   78.3     4   17.4    5 100.0             1   4.3
186.1   0.7   1.0   21   91.3     2    8.7    2 100.0
187.1   0.7   1.0   22   95.7     1    4.3    1 100.0
188.1   0.8   1.3   19   82.6     4   17.4    4 100.0
189.1   0.5   0.8   20   87.0     3   13.0    3 100.0
190.1   0.5   3.1   20   87.0     3   13.0    3 100.0
191.1   0.6   1.6   18   78.3     5   21.7    5 100.0
192.1   0.6   0.6   21   91.3     2    8.7    2 100.0
193.1   0.5   1.6   21   91.3     2    8.7    2 100.0
194.1   0.9   4.6   14   60.9     9   39.1
195.1   1.1   1.6   15   65.2     8   34.8
196.1   1.5   4.3    9   39.1    13   56.5                        1   4.3
197.1   1.8   3.2   10   43.5    12   52.2                        1   4.3
198.1   0.8   7.0   18   78.3     5   21.7
199.1   0.9   4.4   18   78.3     5   21.7
200.1   1.1   3.7   17   73.9     6   26.1
201.1   1.3   2.7   15   65.2     8   34.8
202.1   1.3         22   95.7                                     1   4.3
203.1   0.9   2.5   22   95.7     1    4.3
204.1   1.0         23  100.0
205.1   1.2          4   17.4
206.1   1.0          4   17.4

END OF DATA ANALYSIS FOR LESSON  103
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Appendix 10

Summary of Grammatical Material
First Half of Fall Quarter
Sessions 1-26

Alphabet: All letters except hard sign--printed and written. Orthorgraphic rules for writing of vowel letters, soft sign and [-j-/. (For transliteration equivalents, see Appendix 2, Table 1.)

Phonology: All vowel and consonant phonemes. Major allophones of stressed and unstressed vowels. Devoicing of obstruents in final position and before voiceless obstruents. Contrasts of type C + j + V vs. C'V. Assimilation of dental fricatives to following palatal. Assimilative voicing of obstruents.

Morphology:

Adjective: Masculine and feminine long forms of the nominative, genitive, accusative, prepositional, and instrumental singular from stems in: (a) paired plain consonants; (b) velars; and (c) palatals.

Noun: First and second declension accusative, genitive, prepositional, and instrumental singular from stems in: (a) all paired consonants; (b) velars; (c) palatals (including stems in -ij); and (d) [-c-/, with stem or desinence stress. Loss of mobile vowel in oblique cases of certain masculines with nominative singular in a consonant. Inflection of foreign names in a consonant--masculine and feminine.

Pronoun:

Personal: [>, on, ona, my, vy, oni-/ in nominative, genitive, prepositional and instrumental. Use of initial [-n-/ in third person when object of preposition.

Interrogative: [-kto, hto-/ in same cases as personal pronouns. [-kakoj-/ in same forms as adjective. [-hej-/ in nominative and accusative masculine and feminine.

Possessive: [-moj, naw, vaw, svoj-/ in same forms as adjective. Uninflected [-ego, e↩ ix-. Use of [-svoj-/ with third person subjects.

Verb: Regular endings of all present tense forms except second person singular. Endings of past except for neuter. Infinitive and third plural present as "basic forms." Rules for stress of first singular present. Consonant alternations in first singular present tense. Present of [-xotet;-/.

Syntax:

Prepositions: Governing genitive--[-u-/. Governing instrumental--za, nad(o), pered(o), pod(o), s(o). Governing prepositional-- o-ob-obo, v(o), na.

Case usage in other environments: Accusative of direct object. Genitive of possession and after [-bo>t;s>-/. Instrumental of means, predicate instrumental after [-byt;-/, and instrumental with [-upravl>t;, interesovat;s>, kazat;s>, shitat;-/ and [-shitat;s>-/.

Conjunctions: [-i-/ vs. [-a-/ vs. [-no-/.

Other: Rendering of "to have" constructions with [-u-/ plus the genitive.

Second Half of Fall Quarter
Sessions 27-46

Alphabet: The hard sign. Value of [-g-/ before [-k-.

Phonology: Allophone of [-i-/ after [-c-.

Morphology:

Adjective: Neuter singular (all cases covered in first half of term.) Dative singular of all three genders.

Noun: Singular of neuters in [-o-/ or [-e-/ (for all cases covered in first half of term). Dative singular of all classes introduced up to this point. Masculines in [-a-/ (all singular forms).

Pronoun:

Personal: Dative case of all mentioned in preceding half term. Declension of [-ono-.

Interrogative: Dative singular of [-kto, hto, kakoj-./ Neuter of [-kakoj-.

Possessive: Dative case of all mentioned in preceding half term. Neuter of same group.

Demonstrative: Masculine, feminine, neuter singular of [-]tot-/ and [-tot-.

Relative: [-kotoryj-/ --same forms as long adjective. Agreement with antecedent in gender and number. Case determined by role in relative clause. As object of preposition. As translation of "whose" in relative clauses.

Negated: Declension of [-nihto-/ and [-nikto-./ Insertion of preposition between [-ni-/ and remainder of form.

Verb: Regular forms of imperative plural. Infinitive, past, and (except for the second singular) present of [-est;-./ Future of imperfective verbs.

Adverbs: Generation of adverbs and impersonal forms in [-o-/ from adjectives. Formation and use of type [-po-russki-.

Syntax:

Prepositions: Governing dative-- [-k(o)-/ and [-po-.

Case usage in other environments: Genitive with adverbs of quantity. Dative as indirect object, as subject of impersonal constructions, and after

[-zvonit;, otvehat;, pomogat;-/ and [-uhit;s>- .

Conjunctions: [-ni ... ni-/ with negated verbs.

Other: Negated verb with [-nikogda, nikto-/, etc. Use of past forms with [->, my, vy-./ Use of future in relative clauses with [-kogda-.

First Half of Winter Quarter

Sessions 47-67

Morphology:

Adjective: Long plural forms, all cases. Long forms of adjectives with stem in a paired palatalized consonant.

Noun: Regular desinences of all plural cases for all nouns covered so far. Regular insertion of vowel in certain genitive plurals. Nominative plural in [-a-/ for masculines. Irregular desinences or vowel insertion in genitive.

Pronoun:

Personal: Inflection and use of [-ty-.

Other: Plural of all possessive, interrogative, demonstrative and relative pronouns previously introduced. Inflection of [-ves;-/ and [-twoj-.

Number: Nominative forms of cardinal numbers 1 through 8. Oblique forms of 1 and 2 through 4. Agreement of noun and adjective with preceding number.

Verb: Perfective vs. imperfective aspect. Future of perfective verbs. The second person singular of the present. The singular imperative. The inflexion of [-dat;-.

Syntax:

Prepositions: Governing accusative--[-za-./ Governing genitive--[-krome, bez-./ Governing instrumental--[-meqdu-.

Case usage in other environments: Genitive of measure, direct object of negated verb, and after [-izbegat;-.

Other: Indirect discourse--statements and questions. Use of [-kak-/ in inquiring about surnames.

Second Half of Winter Quarter

Sessions 68-92

Morphology:

Adjective: Analytic comparative. Analytic superlative.

Noun: Declension of feminine in a consonant. Declension of [-mat;-/ and [-doč;-, -im>-/ and [-vrem>-./ Irregular plurals to [-syn, drug, brat, muž, stul-/, etc. Plural to singulatives in [-in-./ Additional irregular genitive plurals.

Pronoun: Inflection and use of [-každyj-/ and [-takoj-.

Number: Inflection of cardinals 5 through 20 and 30. Compound numbers 21 through 29, 31 through 39. Agreement of nouns and adjectives with all forms of all numbers introduced. Ordinals of all cardinals introduced.

Verb: Irregular imperatives. Second singular present of [-dat;-/ and [-est;-./ Determinate and indeterminate aspect in verbs of motion.

Syntax:

Prepositions: Governing the genitive-- [-do, iz, ot, u-./ Governing the accusative-- [-v-/ and [-na-/ after verbs of motion, and [-čerez-.

Case usage in other environments: Accusative of duration.

Other: Expressions of date of month and day of week.

First Half of Spring Quarter

Sessions 93-111

Morphology:

Adjective: Short forms

Pronoun:

Indefinite: Compounds with /-to/ and /-nibud'/.

Emphatic: Inflection and use of /sam/.

Number: Cardinals and ordinals 40 through 100. /poltora, poltory/.

Verb: Forms of /leč, moč, bežat'/. Prefixed verbs of motion. The conditional mood. Third person optative.

Adverbs: Goal of motion vs. location (/gde/ vs. /kuda/), etc.

Syntax:

Prepositions: Words requiring /na/ as opposed to /v/.

Case usage: Instrumental after /dovol'nyj/. Use of dative and accusative with various meanings of /učit'/.

Conjunctions: Infinitive vs. past tense in constructions with /čtoby/.

Other: Imperative in indirect discourse.

Second Half of Spring Quarter

Sessions 112-135

Morphology:

Adjective: Synthetic comparative. Synthetic superlative.

Noun: Indeclinable nouns.

Pronoun: Rendering of constructions of type "whatever," "whenever," etc. Remaining forms of /-ves'-/.

Number: Cardinals and ordinals 200 through 1,000,000. /-oba, obe-/. Rendering of English two and a half, etc.

Verb: The inclusive imperative. Uses of /-yest'-/ --"there is, are." Compounds with /-po-/ and /-za-/. Present and past verbal adverbs. Present active, past active, and past passive participles.

Adverb: Formation and use of type /-po-russki-./ Comparative.

Syntax:

Prepositions: Governing genitive-- /-dlya, posle, mimo, okolo, bez-/ and /-vmesto-/. Governing accusative-- /-za-/ "for."

Case usage in other environments: Instrumental with /-zanimat'sya, [illegible]-/. Instrumental and/or accusative with /-zvat'-./ Genitive of comparison.

Conjunctions: Compound conjunctions of type /-posle togo, kak-./

Other: Time of day. Designation of year. Idiomatic constructions with comparative.

Appendix 11

Common Portions of Final Examinations--
Autumn, Winter, and Spring Quarters

FIRST-YEAR RUSSIAN

Final Examination - Autumn Quarter

A. Translate into Russian (80 minutes)

1. My rich brother often drank a lot of vodka, but he rarely ate much meat.
2. The girl, about whom we were talking, plays the piano very badly.
3. Did you know that this handsome young American is a Russian teacher?
4. Why doesn't he want to write with his pencil? He knows that I don't have a pen.
5. It's easy for you to speak English because your father was an American.
6. The letter, which they were writing to their leader, is lying on the desk in their room.
7. When we lived in England we had neither an automobile nor a house.
8. Tomorrow they will have both a new lesson and a short examination.
9. I like to help him, but I don't want to talk with him about my lecture.
10. My friend's home is on this street in that large building.
11. In the summer I live in a cottage in the country with my wife and her sister.
12. Do you remember the old doctor whose son was a student at the university when you worked at the bank?
13. It's very difficult to talk with this comrade. He's always smoking and he doesn't listen to anyone.
14. The woman, who is sitting with the professor and the journalist, thinks that Anna will be a good writer.
15. Don't you understand that one must never smoke a pipe in her bedroom?
16. Why are you reading that book? It's mine! And the chair you're sitting on is mine too.
17. Why don't you answer her when she asks you about them?
18. They always telephone me in the morning when I'm sleeping.
19. She never explained anything to us, and we never talked about anything with her.
20. The woman in the white dress was formerly a teacher, and the man in the black suit wants to be a rich engineer.

21. In the winter we ate bread and butter and drank good fresh milk.

22. Whose secretary understands English, his or yours?

23. That stupid student works very slowly. Her teacher thinks that she never does anything.

24. She has a very intelligent husband, and her brother has a beautiful and rich wife.

25. I see very well that you don't want to talk with me about that.

FINAL EXAMINATION - March 21, 1968

A. Translate into Russian (80 minutes)

1. The teachers explain the new rules, and the students write down everything immediately.
2. Do you have any brothers? Yes, I have seven brothers.
3. On this street there are two famous museums and many small but interesting stores.
4. When I am in Russia I shall read only Russian newspapers.
5. As soon as I have supper, I shall write to father.
6. Our professor said that on Tuesday he would speak about English cities.
7. Anna began reading this novel two weeks ago but she still hasn't finished reading it. She never finishes long novels!
8. I finally asked Zoya where she was going in such a beautiful dress, but she didn't answer me.
9. I don't understand a single word in the third lesson!
10. There were only twelve people at the first lecture.
11. How much did you pay for these two Russian dictionaries? I paid only eight rubles for them.
12. We lived in American 20 years.
13. Did you see those beautiful girls who were sitting in the garden?
14. Don't forget to ask Sonya to come to see me next Friday.
15. When you come home this evening, please buy a bottle of wine.
16. Anna isn't home. She went to Moscow by train three days ago.
17. Ivan wrote that he would leave France in a week.
18. Uncle Andrew used to walk to the bank but now he drives.
19. I am going to a concert tomorrow. Do you (familiar) want to go with me?
20. Never give children cigarettes!

21. Look at that stupid man! He is eating meat with a spoon.

22. In the winter they get up late and go to bed early.

23. Why are your little sisters afraid of Englishmen?

24. Your friends' daughters seem to be intelligent girls.

25. Your skirt is lying there under those old magazines.

FINAL EXAMINATION - June, 1968

Time 2 hours.

1. She wanted me to tell her why their apartment is 10 dollars cheaper than ours.
2. This examination will end at 4:45 P.M.
3. I asked the woman sitting in front of me to take off her hat.
4. Having become interested in Chekov, Igor, the smartest student in our class, read all his writings last summer.
5. Having dropped in on Anna, I chatted a bit with her about the article written by her husband.
6. No matter whom I asked, I could not find a single person who knew -- use participle! -- where they had taken the poor old man.
7. Having returned from the store Anna told me to put all the things bought by her on the shelf.
8. Tolstoy died on January 29, 1837.
9. Although my nephew Andrew is studying mathematics at the university, he rarely studies.
10. If you are free next week, let's go to the country.
11. This evening my sister will have dinner at our place.
12. She often brings her friends to our house.
13. On Sundays we always carry the table and chairs out into the garden.
14. I hope they will leave in half an hour, not later.
15. He asked whether we would be home in the evening.
16. Which of these armchairs is the cheapest one--the white one or the black one?
17. It's easier to write with a pen than with this little pencil.
18. As soon as I began to talk about that, Ivan left.
19. How do you like your new house? It is just as beautiful as ours and much bigger.

20. I used to have to get up at six A.M. in order to get -- arrive at -- to work.

21. Today is Saturday, the eighth of June, nineteen hundred and sixty-eight.

22. While standing at the board, the professor said for us to put all our books under our chairs.

23. I translated the first thirty-one short sentences from English into Russian.

24. At half past three I suddenly felt like taking a little walk.

25. Having given my things to the teacher, I went out of the room in which the students were working.

26. Before returning to the examination I bought a glass of fresh milk from a well-dressed young woman. She told me to hurry, because it was already after three.

27. Having understood that I had stayed too long, I put on the table the milk sold to me by the young woman and ran into the school.

28. On the way to the classroom, at five minutes after three, I noticed that thirty two minutes had already passed.

29. Having entered the room, I went up to the teacher and started to explain why I was late.

30. He answered me with these words -- please speak somewhat more slowly -- the quieter the better! Here's your notebook, but your place has been occupied by the professor's nephew.

31. You will have to sit on the floor.

32. If I had not been afraid of the man's brothers, I would have left immediately, but having understood that I myself had made the mistake, I took my pencil and sat down on the floor.

Appendix 12

Summary by Sequence of Type and Content

SUMMARY BY SEQUENCE OF TYPE AND CONTENT
LESSONS 1 - 19

CONTENT ITEM TYPE	SAME SAME	SAME DIFF.	DIFFERENT SAME	DIFFERENT DIFF.
TYPE ANSWERS				
NO. OF ITEMS	0	0	101	50
AVERAGE CORRECT	0.0	0.0	61.9	61.7
SAMPLE VAR.	0.0	0.0	625.8	734.9
AV. COR. LATENCY	0.0	0.0	1.0	1.0
SAMPLE VAR.	0.0	0.0	0.1	0.2
TRANSLATE				
NO. OF ITEMS	1	0	305	175
AVERAGE CORRECT	94.7	0.0	72.4	60.4
SAMPLE VAR.	0.0	0.0	472.8	623.7
AV. COR. LATENCY	0.7	0.0	1.0	1.1
SAMPLE VAR.	0.0	0.0	0.1	0.1
TRANSCRIBE				
NO. OF ITEMS	1	0	115	30
AVERAGE CORRECT	96.6	0.0	73.9	63.7
SAMPLE VAR.	0.0	0.0	483.8	748.6
AV. COR. LATENCY	1.3	0.0	0.7	1.4
SAMPLE VAR.	0.0	0.0	0.1	1.7
TRANSFORM				
NO. OF ITEMS	0	0	25	11
AVERAGE CORRECT	0.0	0.0	75.9	77.1
SAMPLE VAR.	0.0	0.0	414.9	390.0
AV. COR. LATENCY	0.0	0.0	1.2	1.1
SAMPLE VAR.	0.0	0.0	0.1	0.1
TRANSFORM INFLECTION				
NO. OF ITEMS	64	6	66	48
AVERAGE CORRECT	88.2	86.5	76.7	77.0
SAMPLE VAR.	189.1	123.6	458.7	298.7
AV. COR. LATENCY	1.0	1.2	1.2	1.5
SAMPLE VAR.	0.2	0.2	0.3	0.7
INFLECT				
NO. OF ITEMS	162	22	302	160
AVERAGE CORRECT	96.4	94.4	74.9	76.6
SAMPLE VAR.	49.0	84.4	462.6	469.5
AV. COR. LATENCY	1.7	2.3	2.5	2.9
SAMPLE VAR.	0.7	2.4	1.4	1.9
TRANSLATE & INFLECT				
NO. OF ITEMS	0	0	23	9
AVERAGE CORRECT	0.0	0.0	69.4	68.9
SAMPLE VAR.	0.0	0.0	535.2	354.7
AV. COR. LATENCY	0.0	0.0	2.0	1.6
SAMPLE VAR.	0.0	0.0	0.3	0.2

SUMMARY BY SEQUENCE OF TYPE AND CONTENT
LESSONS 20 - 33

CONTENT ITEM TYPE	SAME SAME	 DIFF.	DIFFERENT SAME	 DIFF.
TYPE ANSWERS				
NO. OF ITEMS	0	0	73	29
AVERAGE CORRECT	0.0	0.0	71.4	66.3
SAMPLE VAR.	0.0	0.0	456.7	463.4
AV. COR. LATENCY	0.0	0.0	0.9	0.8
SAMPLE VAR.	0.0	0.0	0.1	0.0
TRANSLATE				
NO. OF ITEMS	1	0	185	144
AVERAGE CORRECT	100.0	0.0	77.0	59.1
SAMPLE VAR.	0.0	0.0	416.2	617.5
AV. COR. LATENCY	0.8	0.0	0.9	1.0
SAMPLE VAR.	0.0	0.0	0.1	0.1
TRANSCRIBE				
NO. OF ITEMS	0	0	161	74
AVERAGE CORRECT	0.0	0.0	80.7	68.7
SAMPLE VAR.	0.0	0.0	250.6	605.9
AV. COR. LATENCY	0.0	0.0	0.7	0.7
SAMPLE VAR.	0.0	0.0	0.2	0.0
TRANSFORM				
NO. OF ITEMS	0	0	17	8
AVERAGE CORRECT	0.0	0.0	72.3	79.6
SAMPLE VAR.	0.0	0.0	311.7	131.6
AV. COR. LATENCY	0.0	0.0	1.0	1.1
SAMPLE VAR.	0.0	0.0	0.1	0.0
TRANSFORM INFLECTION				
NO. OF ITEMS	29	3	70	51
AVERAGE CORRECT	99.9	91.7	73.7	80.7
SAMPLE VAR.	106.7	81.2	549.8	426.5
AV. COR. LATENCY	0.9	0.8	0.9	1.2
SAMPLE VAR.	0.2	0.0	0.1	0.5
INFLECT				
NO. OF ITEMS	281	46	398	204
AVERAGE CORRECT	95.3	96.2	80.2	76.5
SAMPLE VAR.	113.1	46.5	454.2	452.3
AV. COR. LATENCY	1.4	1.3	2.3	2.7
SAMPLE VAR.	0.4	0.5	1.0	1.2
TRANSLATE & INFLECT				
NO. OF ITEMS	7	2	56	30
AVERAGE CORRECT	98.0	79.2	75.7	75.5
SAMPLE VAR.	12.0	206.0	614.4	365.8
AV. COR. LATENCY	1.4	2.0	1.6	1.9
SAMPLE VAR.	0.4	1.0	0.3	0.3

SUMMARY BY SEQUENCE OF TYPE AND CONTENT
LESSONS 34 - 46

CONTENT	SAME		DIFFERENT	
ITEM TYPE	SAME	DIFF.	SAME	DIFF.
TYPE ANSWERS				
NO. OF ITEMS	0	0	41	13
AVERAGE CORRECT	0.0	0.0	83.5	86.4
SAMPLE VAR.	0.0	0.0	184.4	84.2
AV. COR. LATENCY	0.0	0.0	0.8	0.7
SAMPLE VAR.	0.0	0.0	0.1	0.0
TRANSLATE				
NO. OF ITEMS	4	0	297	70
AVERAGE CORRECT	76.8	0.0	77.2	79.0
SAMPLE VAR.	276.5	0.0	473.7	281.4
AV. COR. LATENCY	0.8	0.0	0.9	0.9
SAMPLE VAR.	0.0	0.0	0.1	0.1
TRANSCRIBE				
NO. OF ITEMS	0	0	66	38
AVERAGE CORRECT	0.0	0.0	82.9	74.5
SAMPLE VAR.	0.0	0.0	226.2	577.3
AV. COR. LATENCY	0.0	0.0	0.6	0.6
SAMPLE VAR.	0.0	0.0	0.0	0.0
TRANSFORM				
NO. OF ITEMS	0	0	12	4
AVERAGE CORRECT	0.0	0.0	75.6	87.1
SAMPLE VAR.	0.0	0.0	382.2	403.7
AV. COR. LATENCY	0.0	0.0	0.9	0.9
SAMPLE VAR.	0.0	0.0	0.1	0.0
TRANSFORM INFLECTION				
NO. OF ITEMS	0	0	76	11
AVERAGE CORRECT	0.0	0.0	64.6	82.0
SAMPLE VAR.	0.0	0.0	370.5	202.5
AV. COR. LATENCY	0.0	0.0	1.2	0.9
SAMPLE VAR.	0.0	0.0	0.5	0.2
INFLECT				
NO. OF ITEMS	173	6	566	96
AVERAGE CORRECT	96.8	95.6	86.5	87.8
SAMPLE VAR.	51.2	14.5	257.7	164.6
AV. COR. LATENCY	1.3	1.1	2.1	2.2
SAMPLE VAR.	0.4	0.1	1.1	0.7
TRANSLATE & INFLECT				
NO. OF ITEMS	8	0	59	24
AVERAGE CORRECT	95.0	0.0	83.6	84.8
SAMPLE VAR.	26.5	0.0	245.2	167.0
AV. COR. LATENCY	1.1	0.0	1.4	1.6
SAMPLE VAR.	0.1	0.0	0.3	0.4

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            SUMMARY BY SEQUENCE OF TYPE AND CONTENT
                        LESSONS  47 -  65

          CONTENT             SAME              DIFFERENT
          ITEM TYPE       SAME    DIFF.       SAME    DIFF.
---------------------------------------------------------------
TYPE ANSWERS
     NO. OF ITEMS            0        0         92       38
     AVERAGE CORRECT       0.0      0.0       73.8     69.7
          SAMPLE VAR.      0.0      0.0      574.3    491.3
     AV. COR. LATENCY      0.0      0.0        0.8      0.9
          SAMPLE VAR.      0.0      0.0        0.1      0.1

TRANSLATE
     NO. OF ITEMS            0        1        246       76
     AVERAGE CORRECT       0.0    100.0       84.2     78.3
          SAMPLE VAR.      0.0      0.0      236.6    376.7
     AV. COR. LATENCY      0.0      0.9        0.8      0.7
          SAMPLE VAR.      0.0      0.0        0.0      0.1

TRANSCRIBE
     NO. OF ITEMS            0        0         64       21
     AVERAGE CORRECT       0.0      0.0       90.1     79.9
          SAMPLE VAR.      0.0      0.0       82.8    698.0
     AV. COR. LATENCY      0.0      0.0        0.7      0.6
          SAMPLE VAR.      0.0      0.0        0.0      0.0

TRANSFORM
     NO. OF ITEMS            0        0          5        2
     AVERAGE CORRECT       0.0      0.0       80.4     76.7
          SAMPLE VAR.      0.0      0.0      166.7    768.3
     AV. COR. LATENCY      0.0      0.0        0.9      0.7
          SAMPLE VAR.      0.0      0.0        0.1      0.1

TRANSFORM INFLECTION
     NO. OF ITEMS           28        0        102       41
     AVERAGE CORRECT      96.6      0.0       87.5     85.3
          SAMPLE VAR.     24.1      0.0      124.8    211.5
     AV. COR. LATENCY      0.8      0.0        0.8      0.9
          SAMPLE VAR.      0.0      0.0        0.1      0.1

INFLECT
     NO. OF ITEMS          127       14        465      125
     AVERAGE CORRECT      95.8     94.5       84.6     82.2
          SAMPLE VAR.     45.3     77.6      300.6    325.3
     AV. COR. LATENCY      1.6      2.1        2.4      3.4
          SAMPLE VAR.      0.8      1.4        1.4      9.5

TRANSLATE & INFLECT
     NO. OF ITEMS            3        0         88       32
     AVERAGE CORRECT      68.7      0.0       72.9     71.3
          SAMPLE VAR.    543.5      0.0      400.8    578.4
     AV. COR. LATENCY      1.1      0.0        1.0      1.3
          SAMPLE VAR.      0.1      0.0        0.1      0.3
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              SUMMARY BY SEQUENCE OF TYPE AND CONTENT
                         LESSONS  66 -  79

         CONTENT              SAME              DIFFERENT
         ITEM TYPE        SAME     DIFF.     SAME     DIFF.
*****************************************************************
TYPE ANSWERS
     NO. OF ITEMS            0        0       122        37
     AVERAGE CORRECT       0.0      0.0      78.9      70.4
          SAMPLE VAR.      0.0      0.0     348.4     424.8
     AV. COR. LATENCY      0.0      0.0       0.8       0.8
          SAMPLE VAR.      0.0      0.0       0.3       0.1

TRANSLATE
     NO. OF ITEMS            0        0       201        77
     AVERAGE CORRECT       0.0      0.0      87.4      71.8
          SAMPLE VAR.      0.0      0.0     227.0     348.2
     AV. COR. LATENCY      0.0      0.0       0.8       0.7
          SAMPLE VAR.      0.0      0.0       0.0       0.9

TRANSCRIBE
     NO. OF ITEMS            0        0        97        97
     AVERAGE CORRECT       0.0      0.0      93.4      77.6
          SAMPLE VAR.      0.0      0.0      90.3     277.5
     AV. COR. LATENCY      0.0      0.0       0.6       0.7
          SAMPLE VAR.      0.0      0.0       0.0       0.1

TRANSFORM
     NO. OF ITEMS            1        0        22         6
     AVERAGE CORRECT      90.9      0.0      82.3      66.8
          SAMPLE VAR.      0.0      0.0     629.0     364.4
     AV. COR. LATENCY      0.6      0.0       0.9       1.6
          SAMPLE VAR.      0.0      0.0       0.1       0.6

TRANSFORM INFLECTION
     NO. OF ITEMS           10        0       128        24
     AVERAGE CORRECT      94.9      0.0      90.1      91.0
          SAMPLE VAR.     20.8      0.0     236.1     268.6
     AV. COR. LATENCY      0.7      0.0       1.0       1.0
          SAMPLE VAR.      0.0      0.0       0.1       0.1

INFLECT
     NO. OF ITEMS           30        2       497       103
     AVERAGE CORRECT      96.5     92.3      83.9      81.7
          SAMPLE VAR.     18.9    118.6     302.1     313.8
     AV. COR. LATENCY      1.7      3.1       2.2       3.3
          SAMPLE VAR.      0.6      9.7       1.1       2.0

TRANSLATE & INFLECT
     NO. OF ITEMS            2        0        53        39
     AVERAGE CORRECT      94.3      0.0      91.1      70.7
          SAMPLE VAR.     66.1      0.0     244.5     696.0
     AV. COR. LATENCY      1.2      0.0       0.9       1.4
          SAMPLE VAR.      0.0      0.0       0.1       1.9
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                 SUMMARY BY SEQUENCE OF TYPE AND CONTENT
                             LESSONS  80 -  92

          CONTENT                SAME                DIFFERENT
          ITEM TYPE          SAME      DIFF.       SAME      DIFF.
------------------------------------------------------------------
TYPE ANSWERS
     NO. OF ITEMS               0          0         15          6
     AVERAGE CORRECT          0.0        0.0       74.8       78.6
          SAMPLE VAR.         0.0        0.0      209.9      260.9
     AV. COR. LATENCY         0.0        0.0        3.8        3.8
          SAMPLE VAR.         0.0        0.0        0.1        0.0

TRANSLATE
     NO. OF ITEMS               0          0        387         96
     AVERAGE CORRECT          0.0        0.0       80.7       69.9
          SAMPLE VAR.         0.0        0.0      337.3      992.0
     AV. COR. LATENCY         0.0        0.0        0.9        0.9
          SAMPLE VAR.         0.0        0.0        0.1        0.1

TRANSCRIBE
     NO. OF ITEMS               0          0         92         19
     AVERAGE CORRECT          0.0        0.0       94.3       79.3
          SAMPLE VAR.         0.0        0.0       49.8      149.3
     AV. COR. LATENCY         0.0        0.0        0.6        0.9
          SAMPLE VAR.         0.0        0.0        0.0        0.1

TRANSFORM
     NO. OF ITEMS               1          0          8          3
     AVERAGE CORRECT         95.9        0.0       84.7       69.7
          SAMPLE VAR.         0.0        0.0      153.2      173.3
     AV. COR. LATENCY         0.6        0.0        0.7        1.0
          SAMPLE VAR.         0.0        0.0        0.0        0.1

TRANSFORM INFLECTION
     NO. OF ITEMS               6          0         57         26
     AVERAGE CORRECT         90.3        0.0       73.9       66.2
          SAMPLE VAR.        43.6        0.0      373.5      692.0
     AV. COR. LATENCY         0.7        0.0        0.8        0.9
          SAMPLE VAR.         0.0        0.0        0.1        0.1

INFLECT
     NO. OF ITEMS              95          1        716        139
     AVERAGE CORRECT         94.3      100.0       86.3       80.8
          SAMPLE VAR.        45.0        0.0      290.1      378.7
     AV. COR. LATENCY         1.3        9.6        1.8        2.6
          SAMPLE VAR.         0.4        0.0        0.8        1.1

TRANSLATE & INFLECT
     NO. OF ITEMS              10          1        119         51
     AVERAGE CORRECT         94.9       93.3       79.4       78.3
          SAMPLE VAR.        12.4        0.0      432.4      993.3
     AV. COR. LATENCY         1.2        9.4        1.3        1.6
          SAMPLE VAR.         0.4        0.0        0.5        1.1
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                 SUMMARY BY SEQUENCE OF TYPE AND CONTENT
                            LESSONS  33 - 135

        CONTENT                 SAME              DIFFERENT
        ITEM TYPE          SAME     DIFF.      SAME     DIFF.
==================================================================
TYPE ANSWERS
    NO. OF ITEMS              0         0          0         0
    AVERAGE CORRECT         0.0       0.0        0.0       0.0
          SAMPLE VAR.       0.0       0.0        0.0       0.0
    AV. COR. LATENCY        0.0       0.0        0.0       0.0
          SAMPLE VAR.       0.0       0.0        0.0       0.0

TRANSLATE
    NO. OF ITEMS              0         0        557       155
    AVERAGE CORRECT         0.0       0.0       73.8      73.0
          SAMPLE VAR.       0.0       0.0      370.7     525.0
    AV. COR. LATENCY        0.0       0.0        0.9       1.0
          SAMPLE VAR.       0.0       0.0        0.0       0.1

TRANSCRIBE
    NO. OF ITEMS              0         0        153        44
    AVERAGE CORRECT         0.0       0.0       94.3      93.9
          SAMPLE VAR.       0.0       0.0       54.0     115.0
    AV. COR. LATENCY        0.0       0.0        0.6       0.9
          SAMPLE VAR.       0.0       0.0        0.0       0.1

TRANSFORM
    NO. OF ITEMS              1         0         42        29
    AVERAGE CORRECT        91.3       0.0       74.5      68.5
          SAMPLE VAR.       0.0       0.0      455.6     559.9
    AV. COR. LATENCY        0.6       0.0        0.9       1.1
          SAMPLE VAR.       0.0       0.0        0.1       0.1

TRANSFORM INFLECTION
    NO. OF ITEMS              6         1        213        44
    AVERAGE CORRECT        95.6      91.3       78.7      78.8
          SAMPLE VAR.      15.9       0.0      425.7     290.6
    AV. COR. LATENCY        0.7       1.0        0.9       1.0
          SAMPLE VAR.       0.0       0.0        0.1       0.3

INFLECT
    NO. OF ITEMS             33         1        578       207
    AVERAGE CORRECT        96.6      78.3       85.6      82.7
          SAMPLE VAR.      64.5       0.0      291.3     385.6
    AV. COR. LATENCY        1.2       1.8        1.5       2.1
          SAMPLE VAR.       0.5       0.0        0.6       1.3

TRANSLATE & INFLECT
    NO. OF ITEMS              5         0        155        44
    AVERAGE CORRECT        91.2       0.0       74.7      71.5
          SAMPLE VAR.     230.6       0.0      634.8     535.4
    AV. COR. LATENCY        0.6       0.0        0.9       1.1
          SAMPLE VAR.       0.0       0.0        0.1       0.9
```